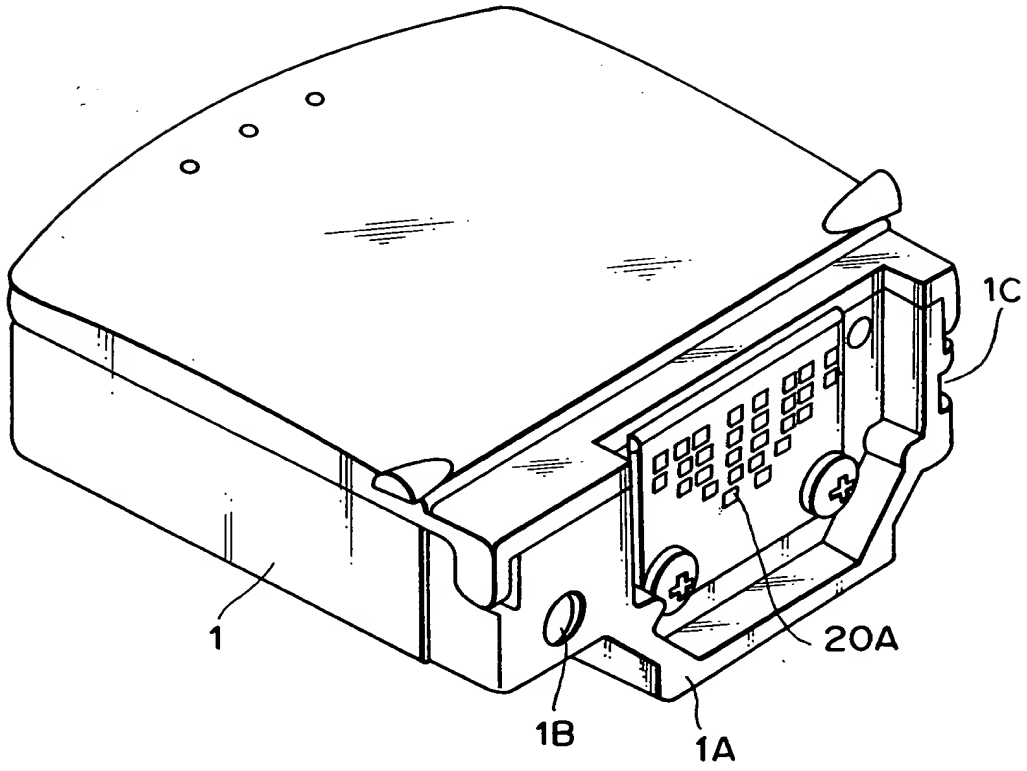
FIG. 1



0095184 2000-04-25

0094-5-2-2-0

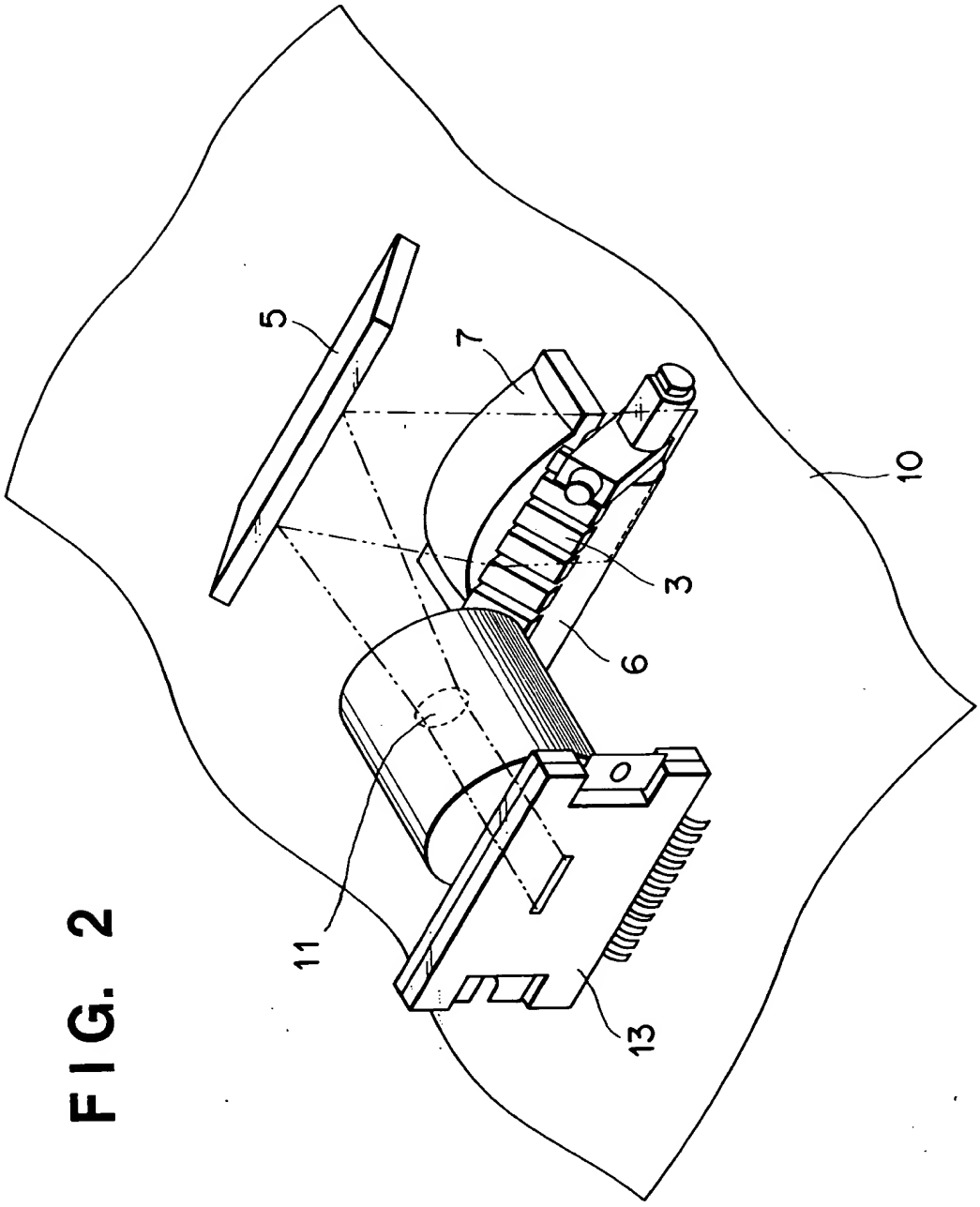


FIG. 2

0062740-9281560

FIG. 3

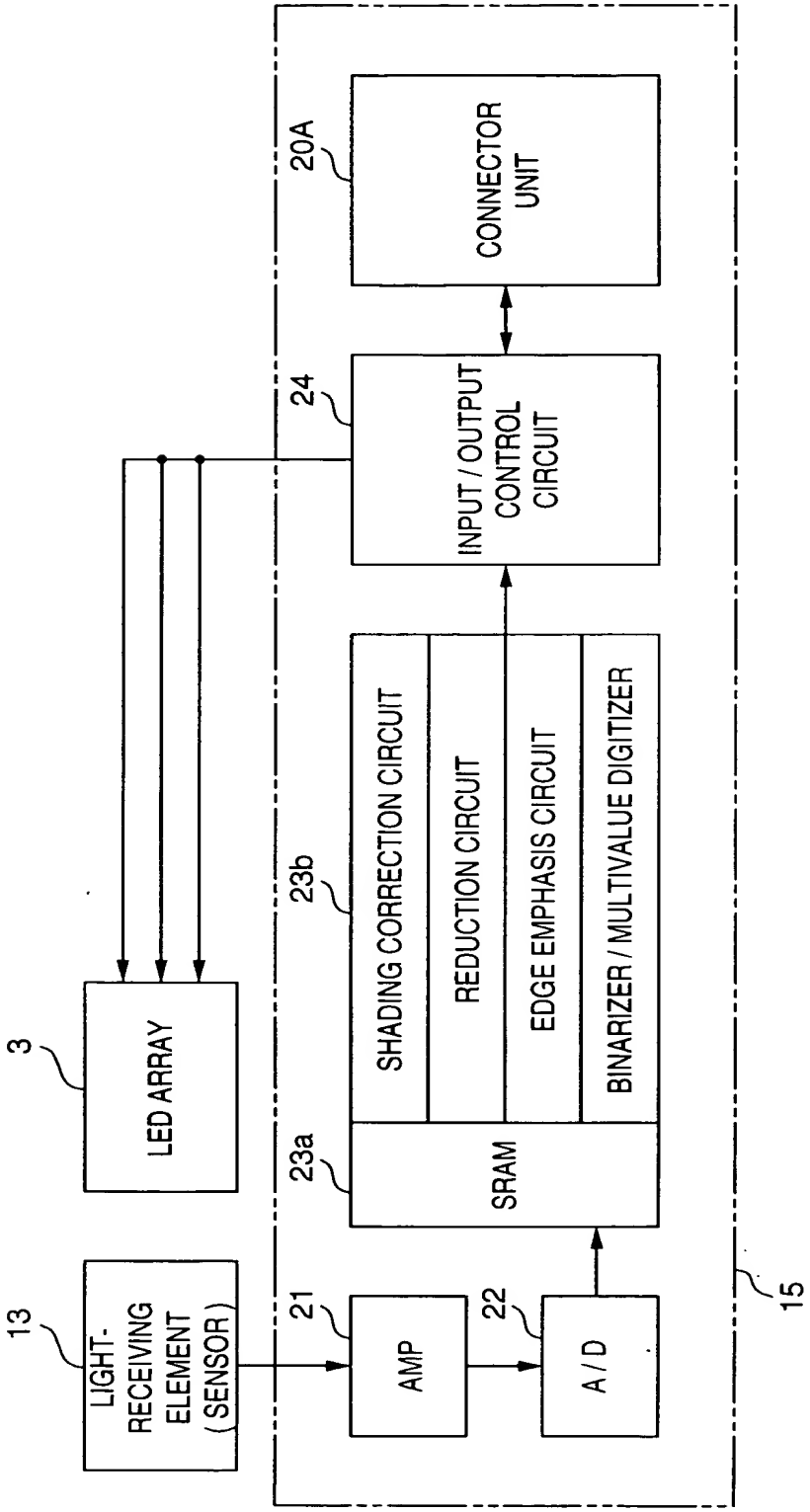
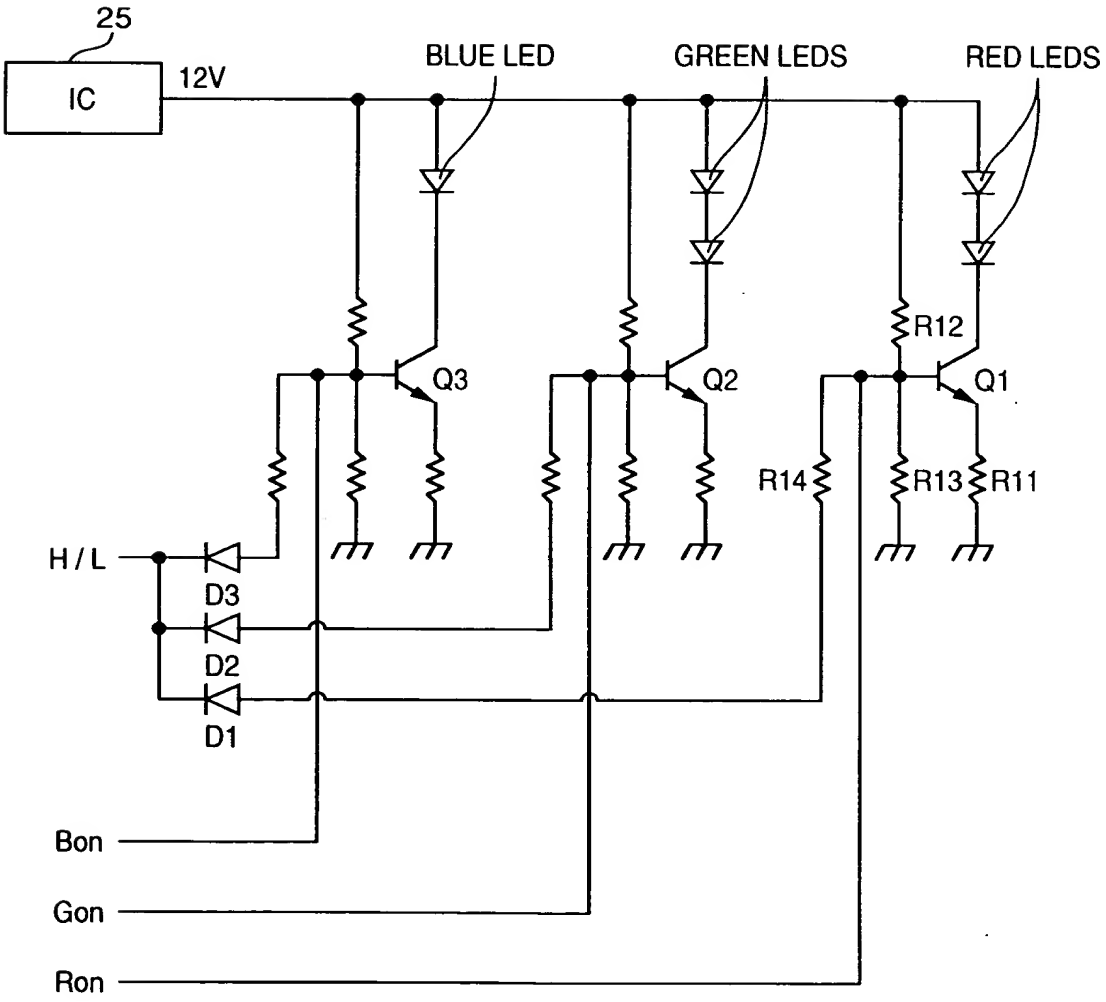
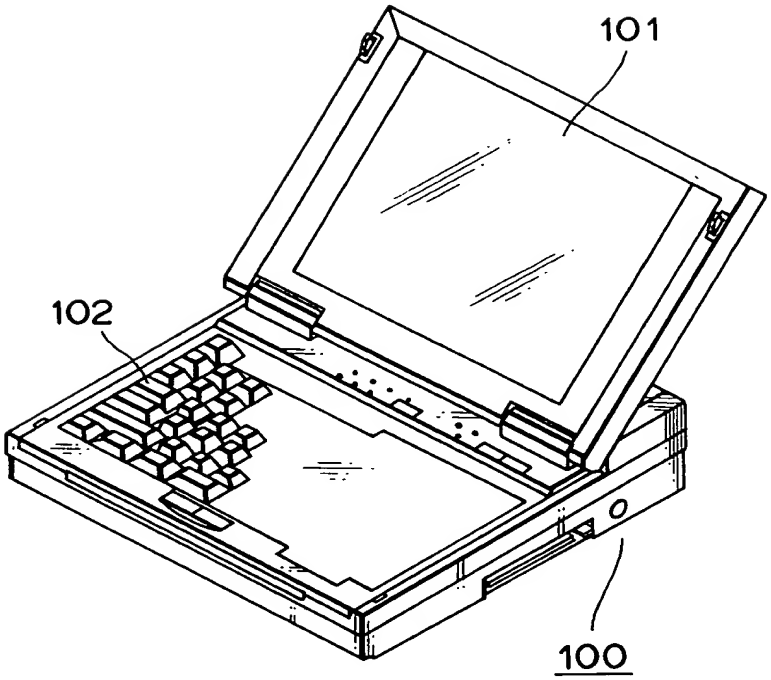


FIG. 4



09/554826 PCT/JP98/05600

FIG. 5



0052-4202-0960

FIG. 6

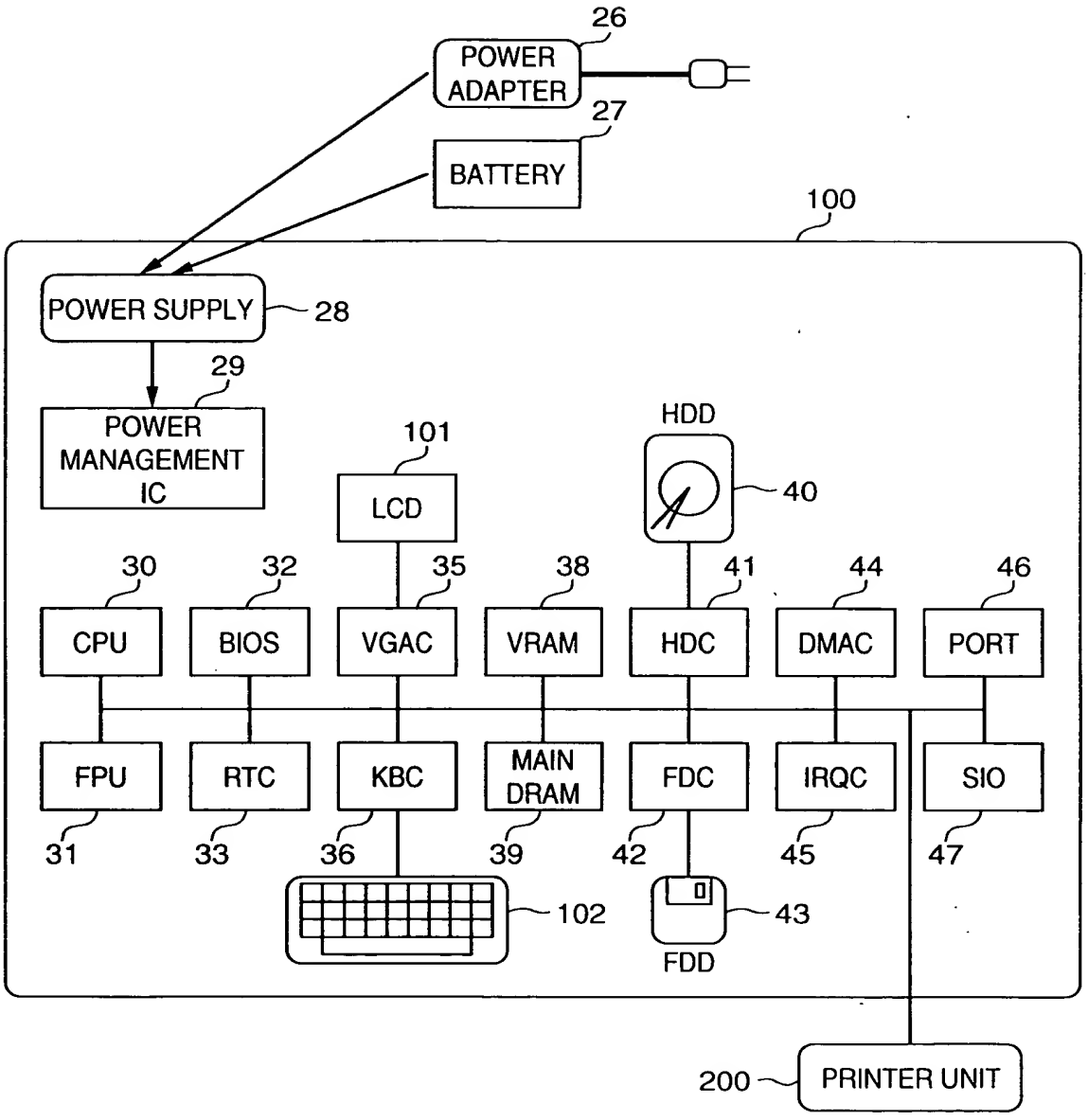
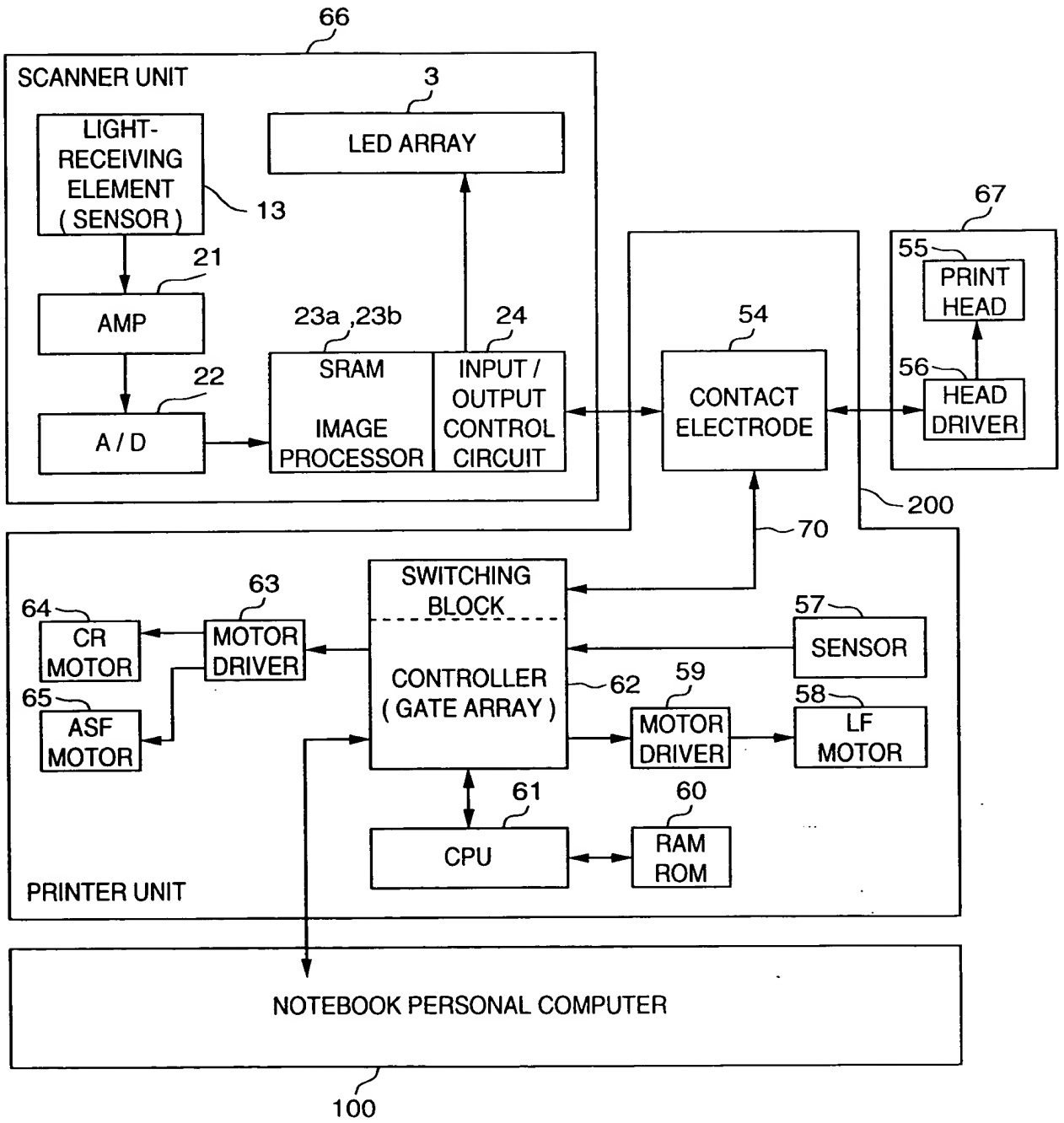

26
POWER ADAPTER
27
BATTERY
100
POWER SUPPLY
28
29
POWER MANAGEMENT IC
101
LCD
HDD
40
30
CPU
32
BIOS
35
VGAC
38
VRAM
41
HDC
44
DMAC
46
PORT
FPU
RTC
KBC
MAIN DRAM
FDC
IRQC
SIO
31
33
36
39
42
45
47
102
43
FDD
200
PRINTER UNIT

FIG. 7


66
SCANNER UNIT
3
LIGHT-RECEIVING ELEMENT (SENSOR)
13
LED ARRAY
67
55
PRINT HEAD
21
AMP
23a ,23b
24
54
56
HEAD DRIVER
22
A / D
SRAM
IMAGE PROCESSOR
INPUT / OUTPUT CONTROL CIRCUIT
CONTACT ELECTRODE
200
70
SWITCHING BLOCK
63
64
CR MOTOR
MOTOR DRIVER
57
SENSOR
65
ASF MOTOR
CONTROLLER (GATE ARRAY)
62
59
58
MOTOR DRIVER
LF MOTOR
61
60
CPU
RAM ROM
PRINTER UNIT
NOTEBOOK PERSONAL COMPUTER
100

0062271 "28154760

FIG. 8

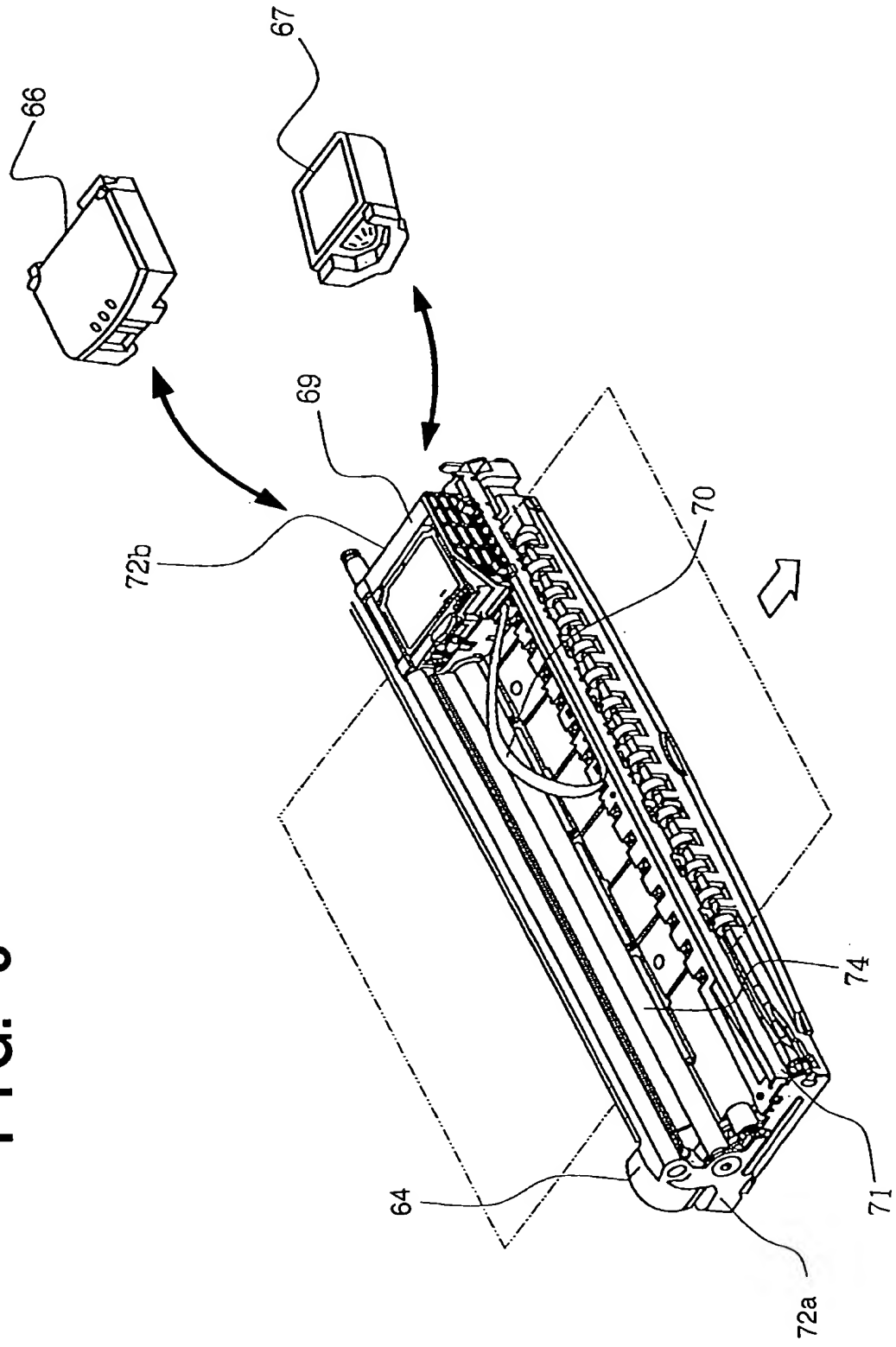
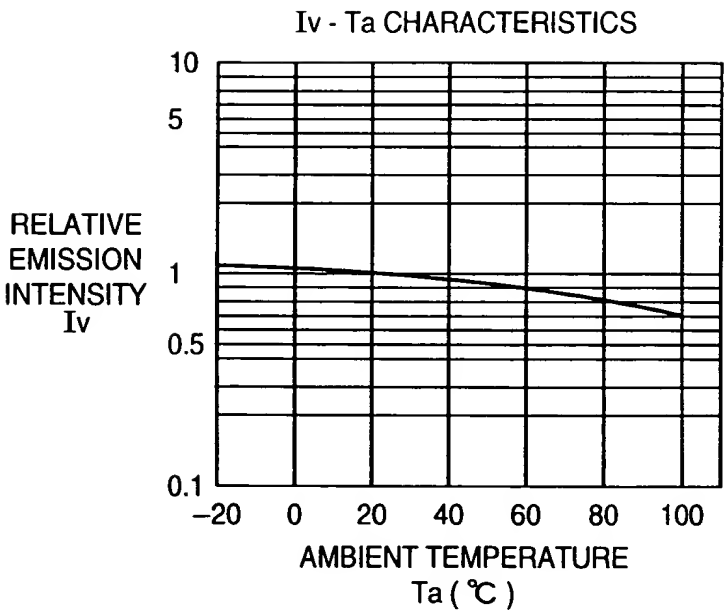
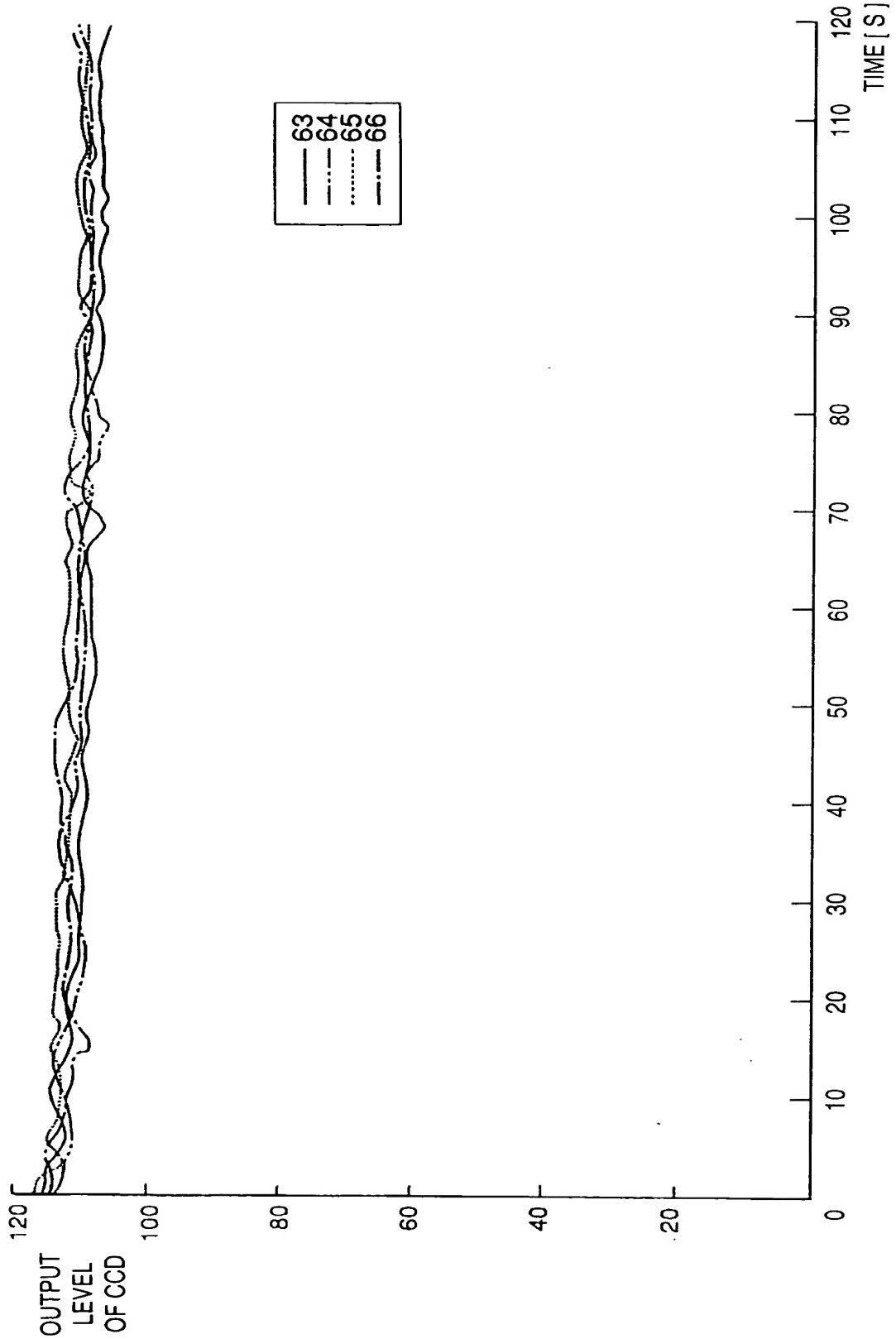


FIG. 9



0975826-4220900

FIG. 10


OUTPUT LEVEL OF CCD
120
100
80
60
40
20
0
10
20
30
40
50
60
70
80
90
100
110
120
TIME [S]
63
64
65
66

0052627 "9381/60

FIG. 11

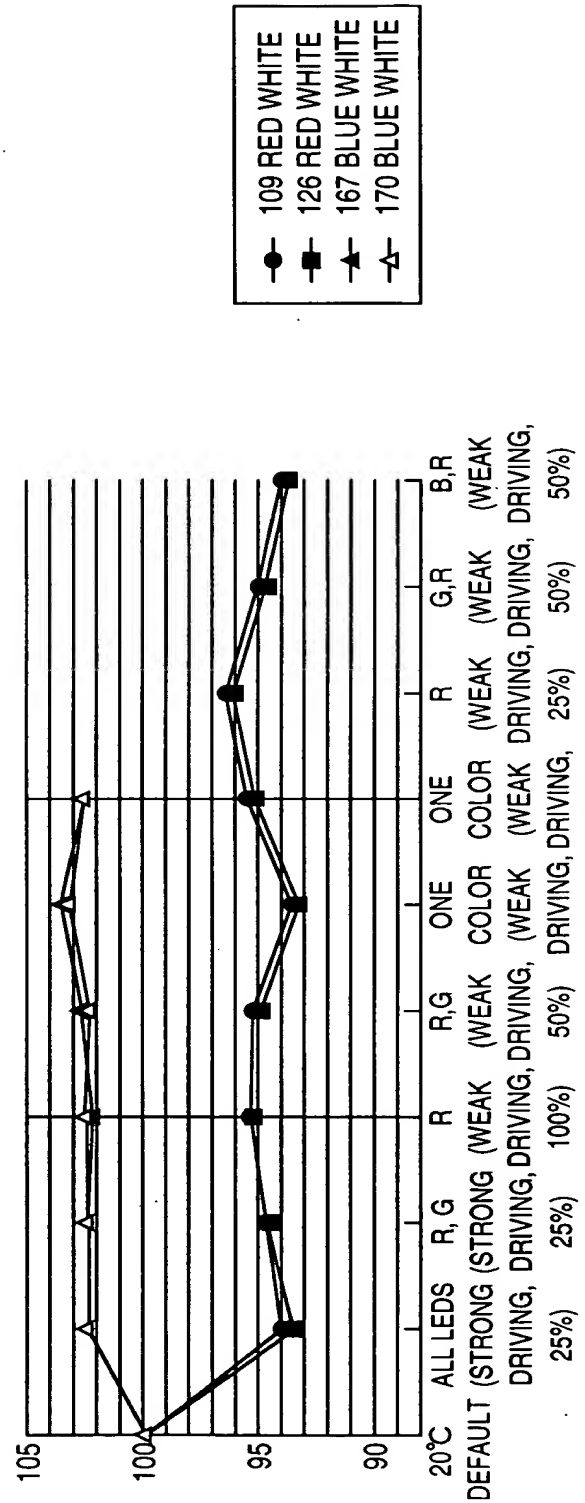


FIG. 12A

COLOR MODE

RESOLUTION	ACCUMU-LATION TIME	FORWARD msec	BACKWARD msec	ONE-LINE TIME msec	DOT WIDTH	NUMBER OF TIMES	A4 TIME msec
360 × 360 dpi ØTR = 0 COLOR	256μsec	3.9K	3.9K		64		
		863.4	863.4	1726.8		66	341906.4
							5'42"
180 × 180 dpi ØTR = 0 COLOR	320μsec	6.25K	6.25K		64		
		545.4	545.4	1090.8		66	215978.4
							3'36"
90 × 90 dpi ØTR = 0 COLOR	307μsec	6.51K	6.51K		64		
		523.6	523.6	1047.2		66	207345.6
							3'27"
200 × 360 dpi ØTR = 0 COLOR	288μsec	6.25K	6.25K		64		
		545.4	545.4	1090.8		66	215978.4
							3'36"
300 × 360 dpi ØTR = 0 COLOR	307μsec	3.9K	3.9K		64		
		863.4	863.4	1726.8		66	341906.4
							5'42"

PAPER FEED TIME : 5 SEC
DELIVERY TIME : 1 SEC

SCAN AREA
HORIZONTAL : 203mm (8 inch)
VERTICAL : 297mm (11.7 inch)

FIG. 12B

MONOCHROME MULTIVALUE MODE

RESOLUTION	ACCUMU-LATION TIME	FORWARD msec	BACKWARD msec	ONE-LINE TIME msec	DOT WIDTH	NUMBER OF TIMES	A4 TIME msec
360 × 360 dpi ØTR = 0 MONO	256μsec	3.9K	3.9K		64		
		863.4	863.4	1726.8		66	113968.8
							1'54"
180 × 180 dpi ØTR = 0 MONO	320μsec	6.25K	6.25K		64		
		545.4	545.4	1090.8		66	71992.8
							1'12"
90 × 90 dpi ØTR = 0 MONO	307μsec	6.51K	6.51K		64		
		523.6	523.6	1047.2		66	69115.2
							1'09"
200 × 360 dpi ØTR = 0 MONO	288μsec	6.25K	6.25K		64		
		545.4	545.4	1090.8		66	71992.8
							1'12"
300 × 360 dpi ØTR = 0 MONO	307μsec	3.9K	3.9K		64		
		863.4	863.4	1726.8		66	113968.8
							1'54"

PAPER FEED TIME : 5 SEC
DELIVERY TIME : 1 SEC

SCAN AREA
HORIZONTAL : 203mm (8 inch)
VERTICAL : 297mm (11.7 inch)

0035480-120900

FIG. 12C

MONOCHROME BINARY MODE

RESOLUTION	ACCUMU-LATION TIME	FORWARD msec	BACKWARD msec	ONE-LINE TIME msec	DOT WIDTH	NUMBER OF TIMES	A4 TIME msec
360 × 360 dpi ØTR = 0 MONO	256μsec	3.9K	3.9K		64		
		863.4	863.4	1726.8		66	113968.8
							1'54"
180 × 180 dpi ØTR = 0 MONO	320μsec	6.25K	6.25K		64		
		545.4	545.4	1090.8		66	71992.8
							1'12"
90 × 90 dpi ØTR = 0 MONO	307μsec	6.51K	6.51K		64		
		523.6	523.6	1047.2		66	69115.2
							1'09"
200 × 360 dpi ØTR = 0 MONO	288μsec	6.25K	6.25K		64		
		545.4	545.4	1090.8		66	71992.8
							1'12"
300 × 360 dpi ØTR = 0 MONO	307μsec	3.9K	3.9K		64		
		863.4	863.4	1726.8		66	113968.8
							1'54"

PAPER FEED TIME : 5 SEC
DELIVERY TIME : 1 SEC

SCAN AREA
HORIZONTAL : 203mm (8 inch)
VERTICAL : 297mm (11.7 inch)

0055869-1120900

FIG. 13

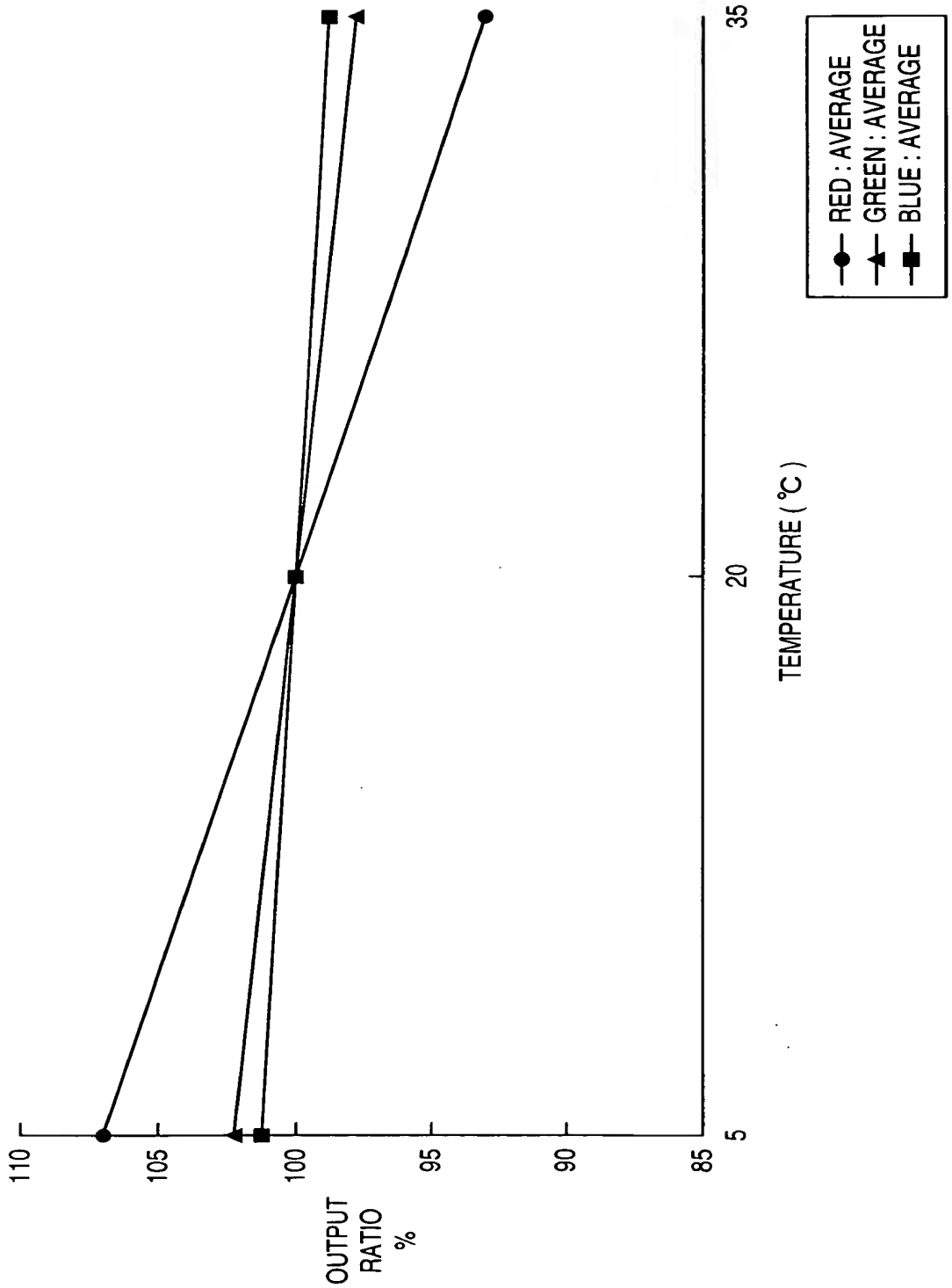
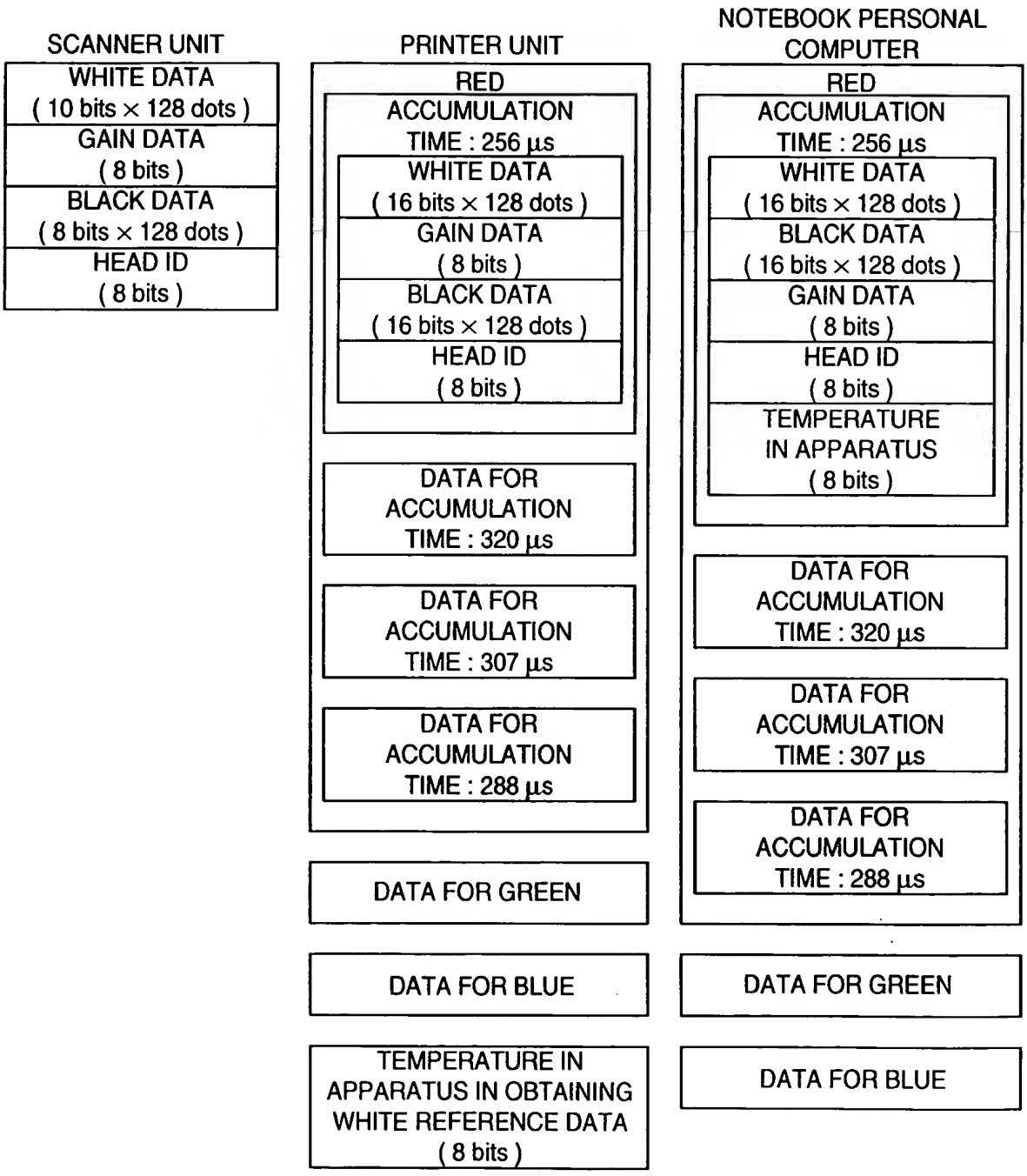

110
105
100
95
90
85
OUTPUT RATIO %
5
20
35
TEMPERATURE (°C)
RED : AVERAGE
GREEN : AVERAGE
BLUE : AVERAGE

FIG. 14



0951800-1120900

0062271 "528154/50

FIG. 15

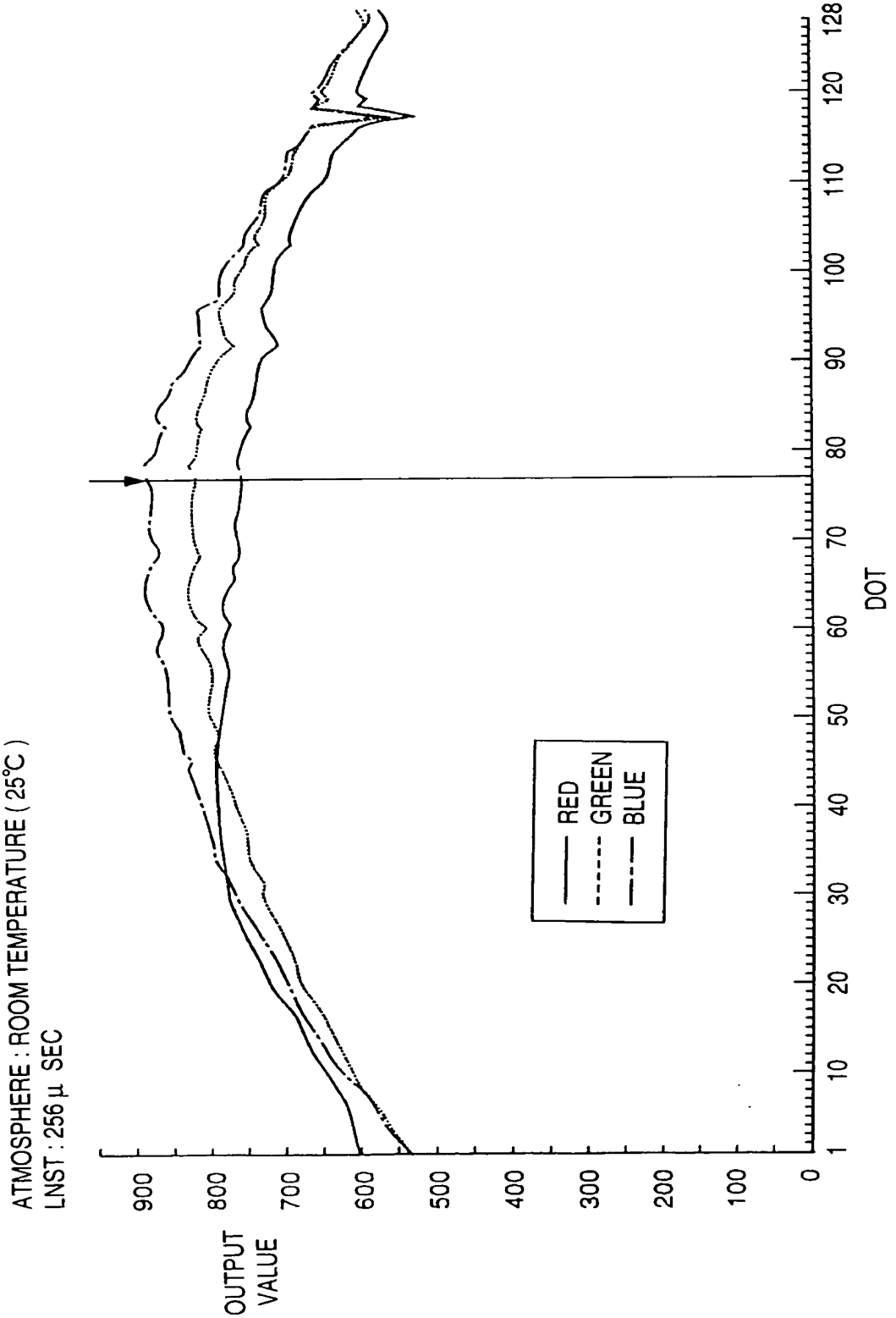


FIG. 16

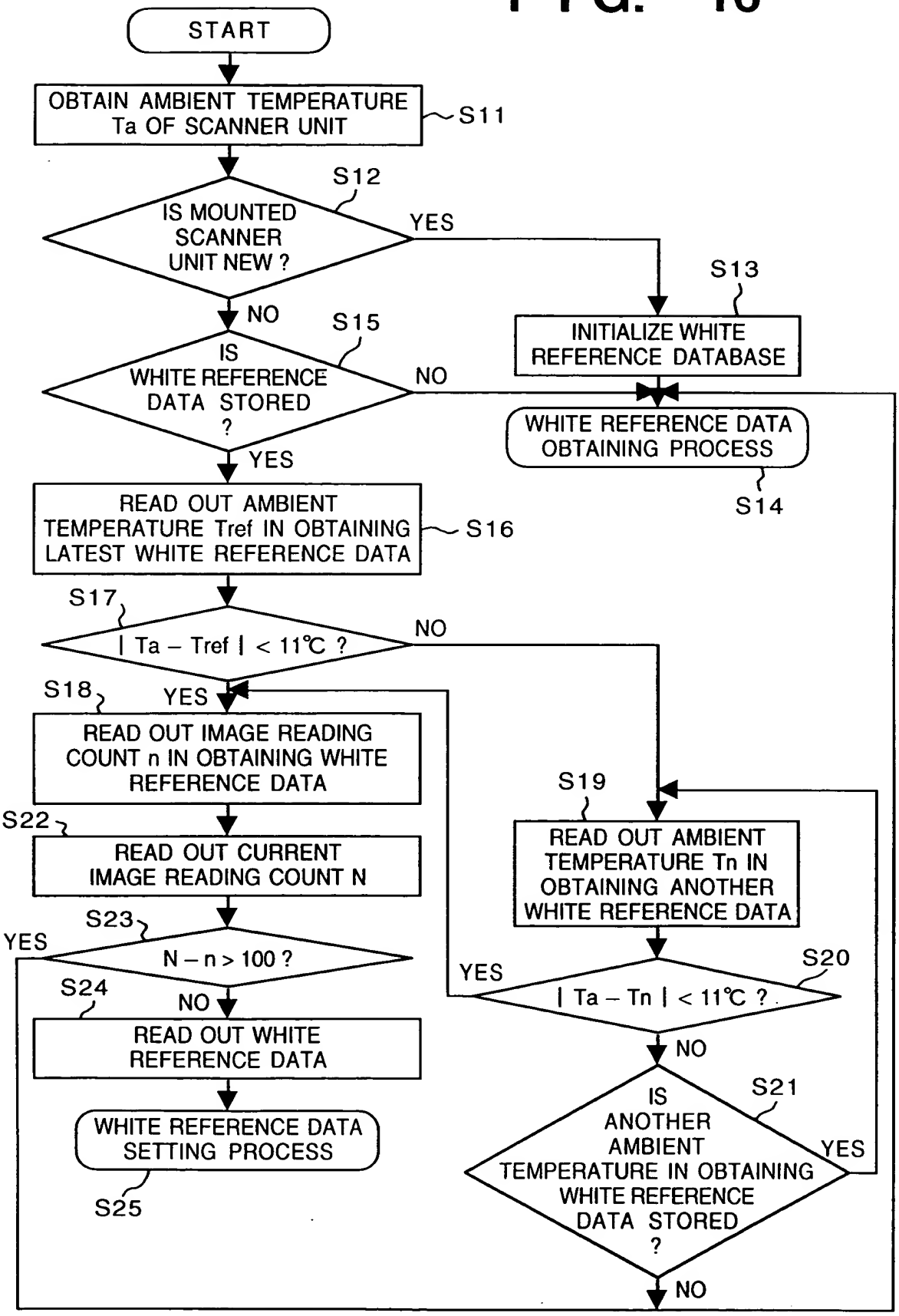
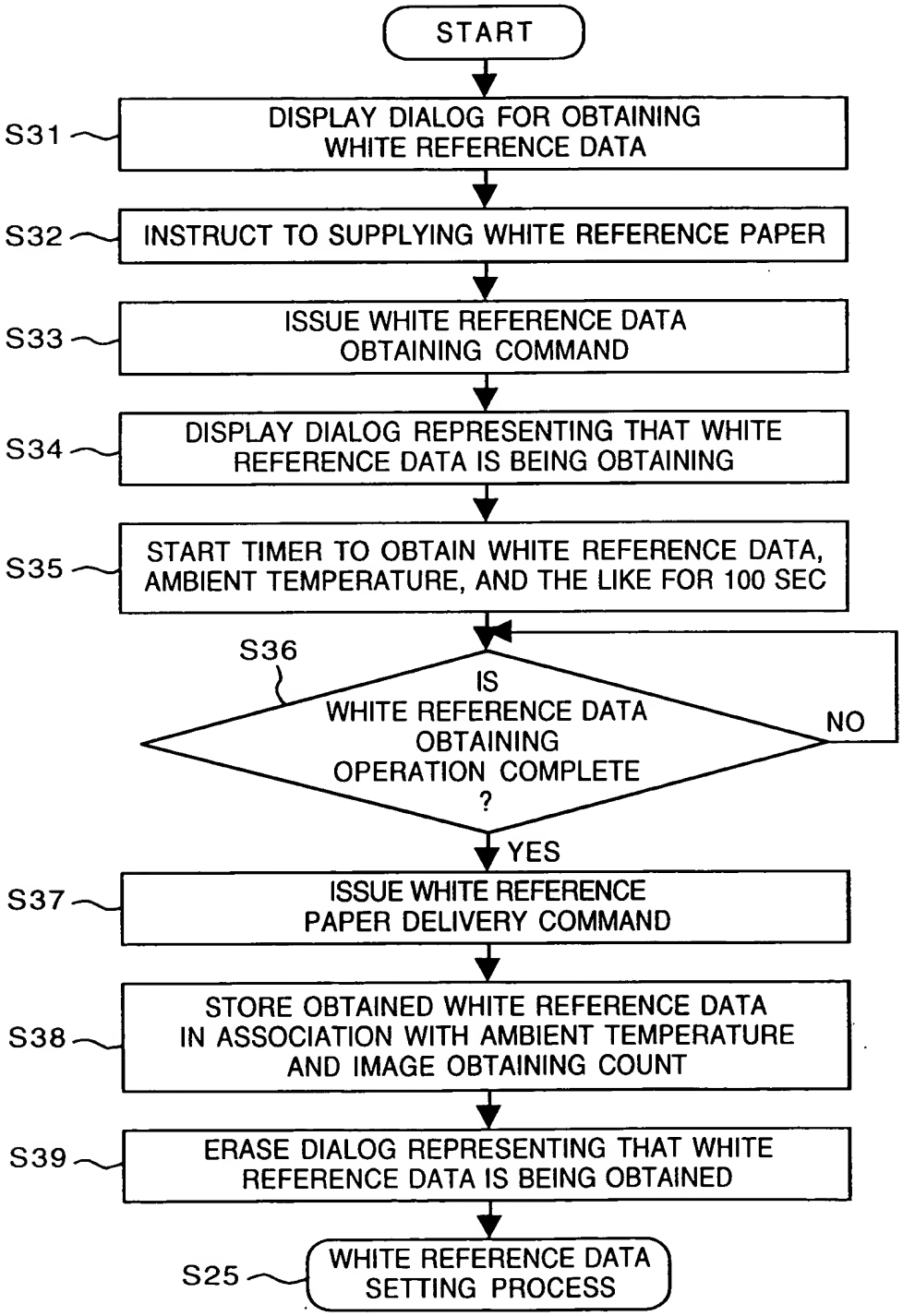

START
OBTAIN AMBIENT TEMPERATURE Ta OF SCANNER UNIT
S11
S12
IS MOUNTED SCANNER UNIT NEW ?
YES
NO
S13
INITIALIZE WHITE REFERENCE DATABASE
S15
IS WHITE REFERENCE DATA STORED ?
NO
YES
WHITE REFERENCE DATA OBTAINING PROCESS
S14
READ OUT AMBIENT TEMPERATURE Tref IN OBTAINING LATEST WHITE REFERENCE DATA
S16
S17
| Ta – Tref | < 11℃ ?
NO
YES
S18
READ OUT IMAGE READING COUNT n IN OBTAINING WHITE REFERENCE DATA
S19
READ OUT AMBIENT TEMPERATURE Tn IN OBTAINING ANOTHER WHITE REFERENCE DATA
S22
READ OUT CURRENT IMAGE READING COUNT N
S23
YES
N – n > 100 ?
S20
YES
| Ta – Tn | < 11℃ ?
S24
NO
READ OUT WHITE REFERENCE DATA
NO
S21
IS ANOTHER AMBIENT TEMPERATURE IN OBTAINING WHITE REFERENCE DATA STORED ?
YES
WHITE REFERENCE DATA SETTING PROCESS
S25
NO

FIG. 17



09/514826 - 042500

FIG. 18

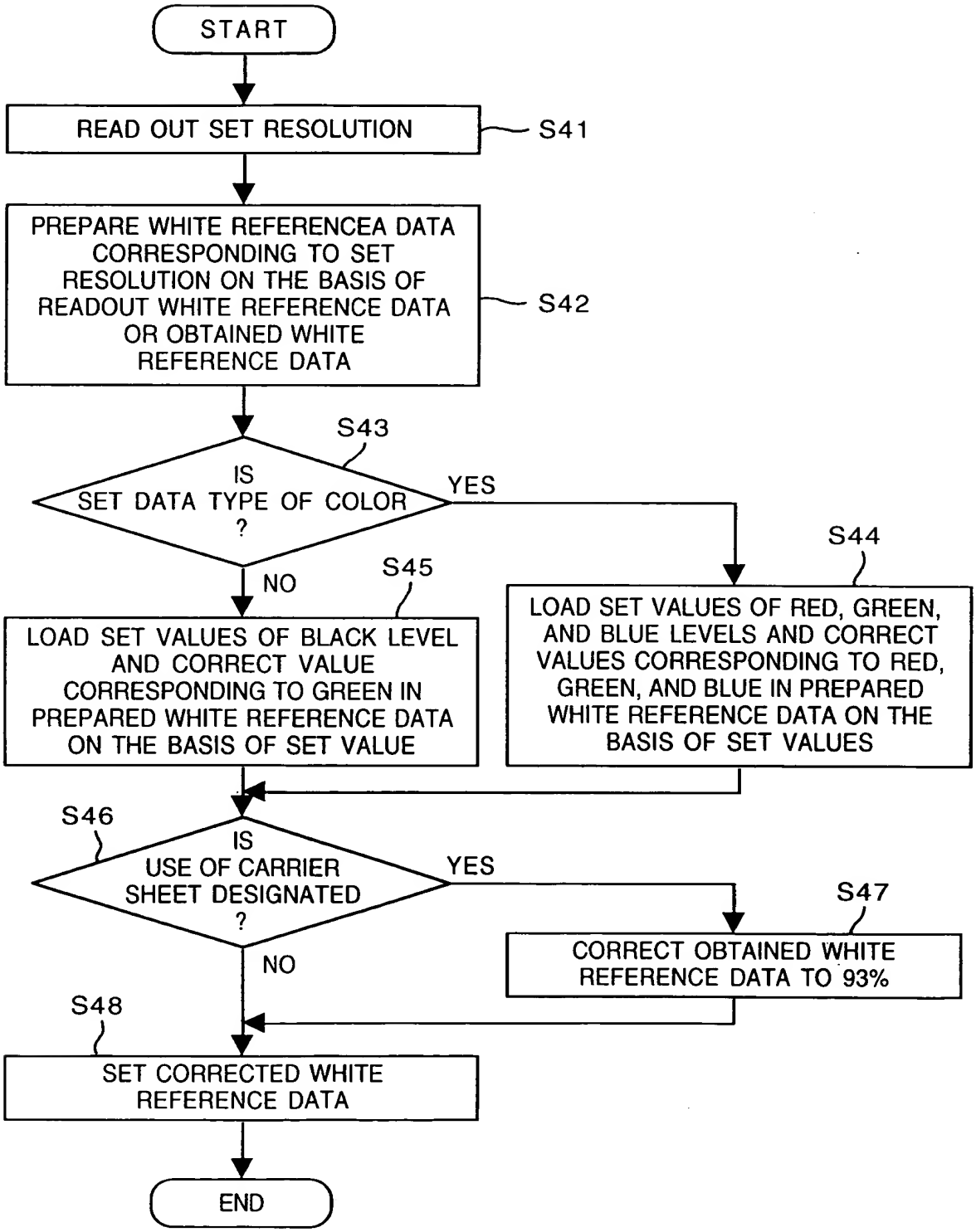

START
READ OUT SET RESOLUTION
S41
PREPARE WHITE REFERENCEA DATA CORRESPONDING TO SET RESOLUTION ON THE BASIS OF READOUT WHITE REFERENCE DATA OR OBTAINED WHITE REFERENCE DATA
S42
S43
IS SET DATA TYPE OF COLOR ?
YES
NO
S44
LOAD SET VALUES OF RED, GREEN, AND BLUE LEVELS AND CORRECT VALUES CORRESPONDING TO RED, GREEN, AND BLUE IN PREPARED WHITE REFERENCE DATA ON THE BASIS OF SET VALUES
S45
LOAD SET VALUES OF BLACK LEVEL AND CORRECT VALUE CORRESPONDING TO GREEN IN PREPARED WHITE REFERENCE DATA ON THE BASIS OF SET VALUE
S46
IS USE OF CARRIER SHEET DESIGNATED ?
YES
NO
S47
CORRECT OBTAINED WHITE REFERENCE DATA TO 93%
S48
SET CORRECTED WHITE REFERENCE DATA
END

FIG. 19

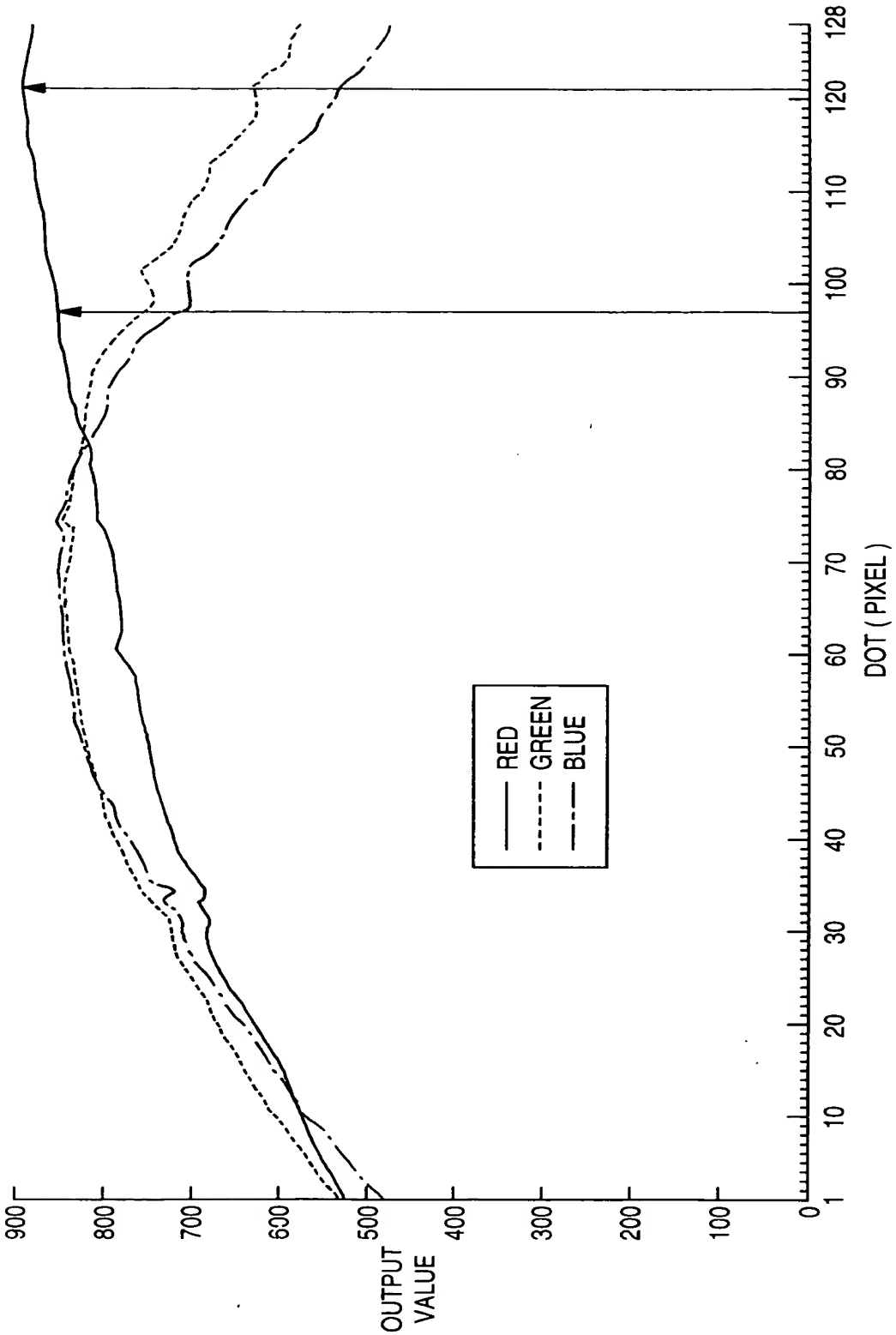
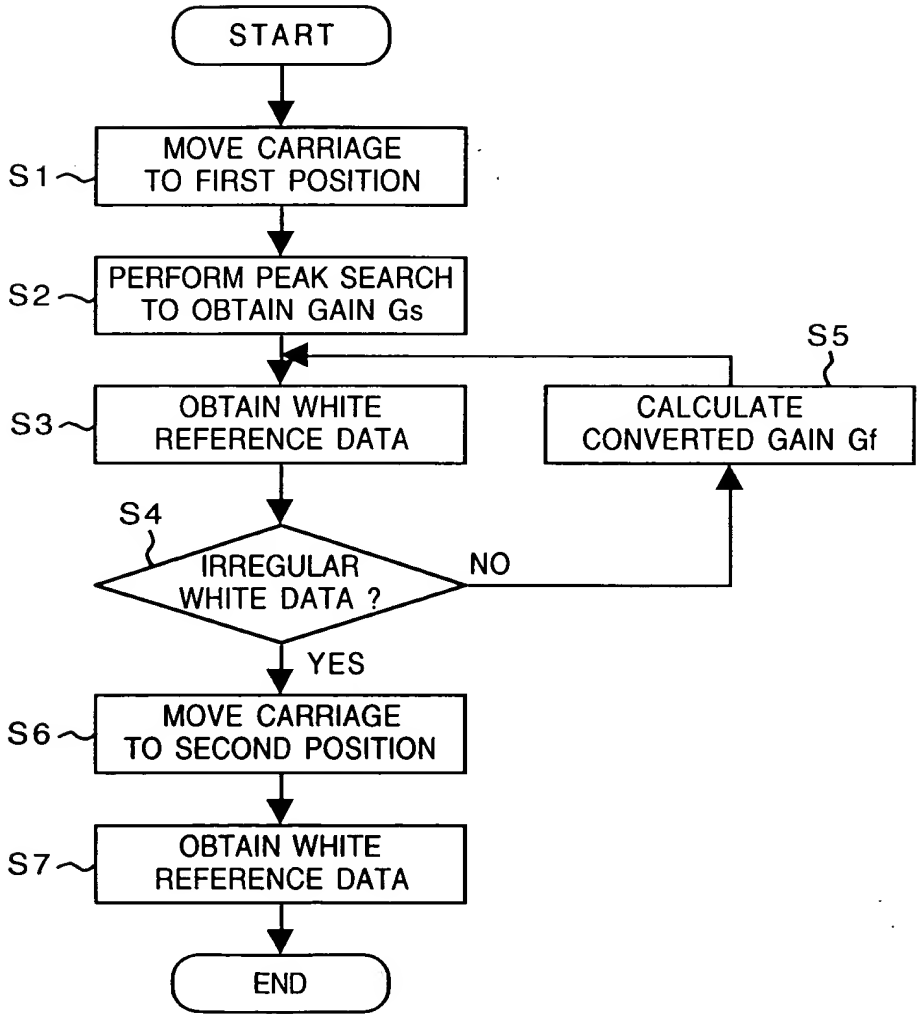
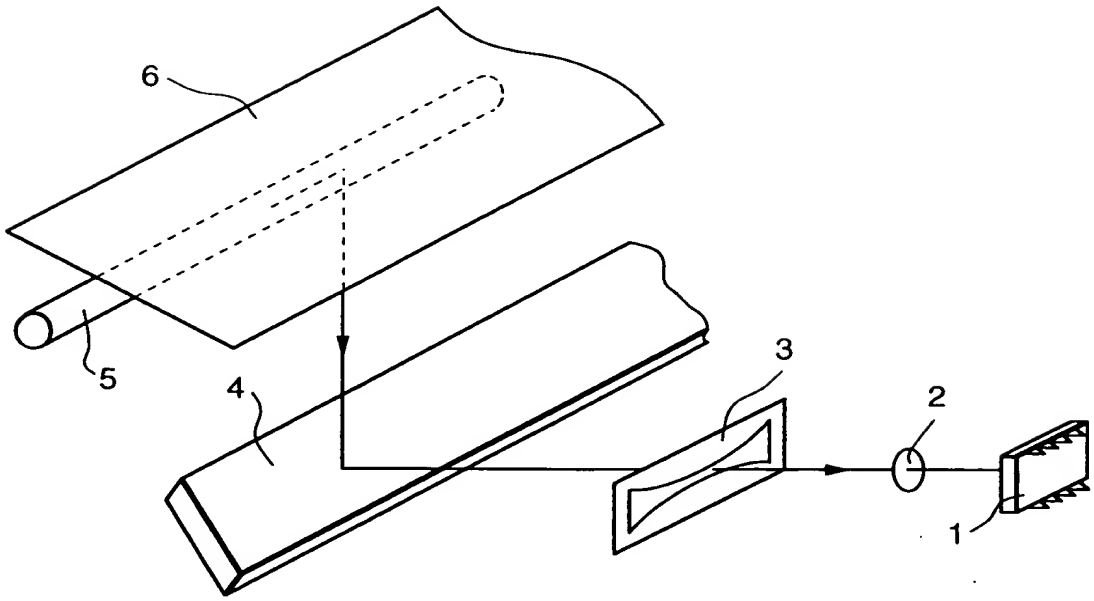

900
800
700
600
500
400
300
200
100
OUTPUT VALUE
0
1
10
20
30
40
50
60
70
80
90
100
110
120
128
DOT (PIXEL)
RED
GREEN
BLUE

FIG. 20



EP 0 955 826 A2

FIG. 21
(PRIOR ART)



09/514826 - 112900

FIG. 22A

0	WHITE REFERENCE DATA OBTAINING COUNT
1	TEMPERATURE IN OBTAINING FIRST REFERENCE DATA
2	TEMPERATURE IN OBTAINING SECOND REFERENCE DATA
3	TEMPERATURE IN OBTAINING THIRD REFERENCE DATA
4	TEMPERATURE IN OBTAINING FOURTH REFERENCE DATA
5	TEMPERATURE IN OBTAINING FIFTH REFERENCE DATA
6 ··· 15	SUPPLEMENTARY AREA

FIG. 22B

FIRST WHITE REFERENCE DATA					
	TIME STAMP				
	WHITE REFERENCE DATA FOR ACCUMULATION TIME OF 256 μs				
		WHITE REFERENCE DATA FOR RED			
			WHITE DATA 1 ···		WHITE DATA 128
			BLACK DATA 1 ···		BLACK DATA 128
			GAIN	SUPPLEMENTARY ID	TEMPERATURE
		WHITE REFERENCE DATA FOR GREEN			
		WHITE REFERENCE DATA FOR BLUE			
	WHITE REFERENCE DATA FOR ACCUMULATION TIME OF 320 μs				
	WHITE REFERENCE DATA FOR ACCUMULATION TIME OF 307 μs				
	WHITE REFERENCE DATA FOR ACCUMULATION TIME OF 288 μs				
	WHITE REFERENCE DATA FOR ACCUMULATION TIME OF 307 μs				
SECOND WHITE REFERENCE DATA					
THIRD WHITE REFERENCE DATA					
FOURTH WHITE REFERENCE DATA					
FIFTH WHITE REFERENCE DATA					

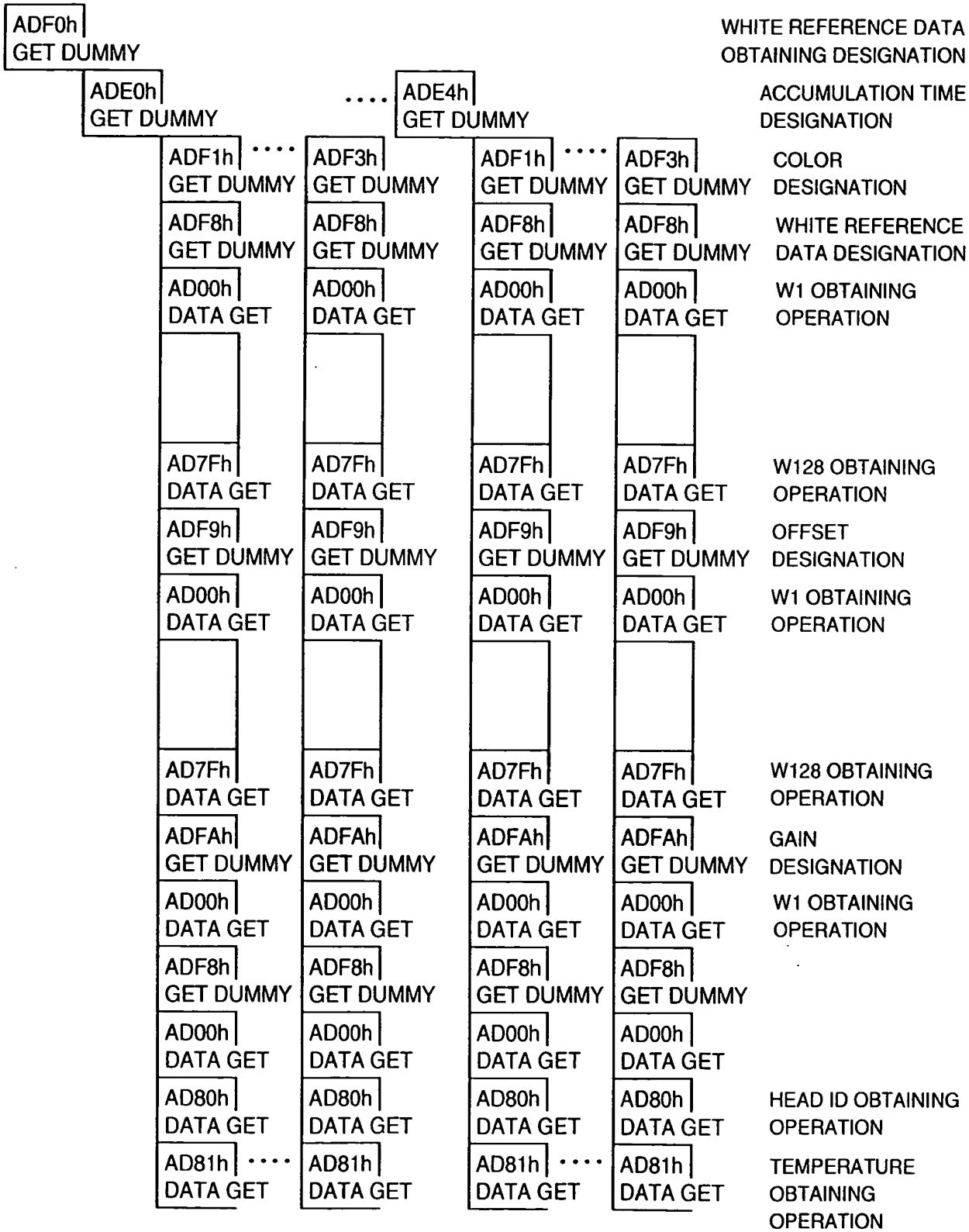
0052-1826-JP2000

FIG. 23

COMMAND PARAMETER	COMMAND CONTENTS
1000H	PORT INITIALIZATION
3000H ~	LEFT OFFSET VALUE DESIGNATION
4000H	PRINT IMAGE TRANSFER
8000H ~	SCANNER READING COMMAND
9000H ~	FEED
9FF0H	DELIVERY
9FF1H	PAPER FEED
A700H	OPERATION FOR OBTAINING CURRENT HEAD TEMPERATURE AND TEMPERATURE IN APPARATUS
A801H	OPERATION FOR OBTAINING MOUNTED HEAD INFORMATION
A809H	OPERATION FOR OBTAINING MOUNTED HEAD ID
AD00H ~ AD7FH	OPERATION FOR OBTAINING WHITE REFERENCE DATA FOR EACH DOT
AD80H	OPERATION FOR OBTAINING HEAD ID IN OBTAINING WHITE REFERENCE DATA
AD81H	OPERATION FOR OBTAINING TEMPERATURE IN OBTAINING WHITE REFERENCE DATA
ADE0H ~ ADE4H	ACCUMULATION TIME DESIGNATION
ADF0H	WHITE REFERENCE DATA OBTAINING DESIGNATION
ADF1H ~ ADF3H	R, G, AND B DESIGNATION
ADF8H	WHITE REFERENCE DATA DESIGNATION
ADF9H	OFFSET DESIGNATION
ADFAH	GAIN DESIGNATION
ADFBH	SUPPLEMENTARY
BD00H ~ BD7FH	WHITE REFERENCE DATA SETTING FOR EACH DOT
BD80H	HEAD ID SETTING
BD81H	TEMPERATURE SETTING
BDE0H ~ BDE4H	ACCUMULATION TIME SETTING
BDF0H	MONOCHROME DESIGNATION
BDF1H ~ BDF3H	R, G, AND B DESIGNATION
BDF8H	WHITE REFERENCE DATA DESIGNATION
BDF9H	OFFSET DESIGNATION
BDFAH	GAIN DESIGNATION
BDFBH	SUPPLEMENTARY
D000H	START OF HEAD EXCHANGE
D100H	END OF HEAD EXCHANGE

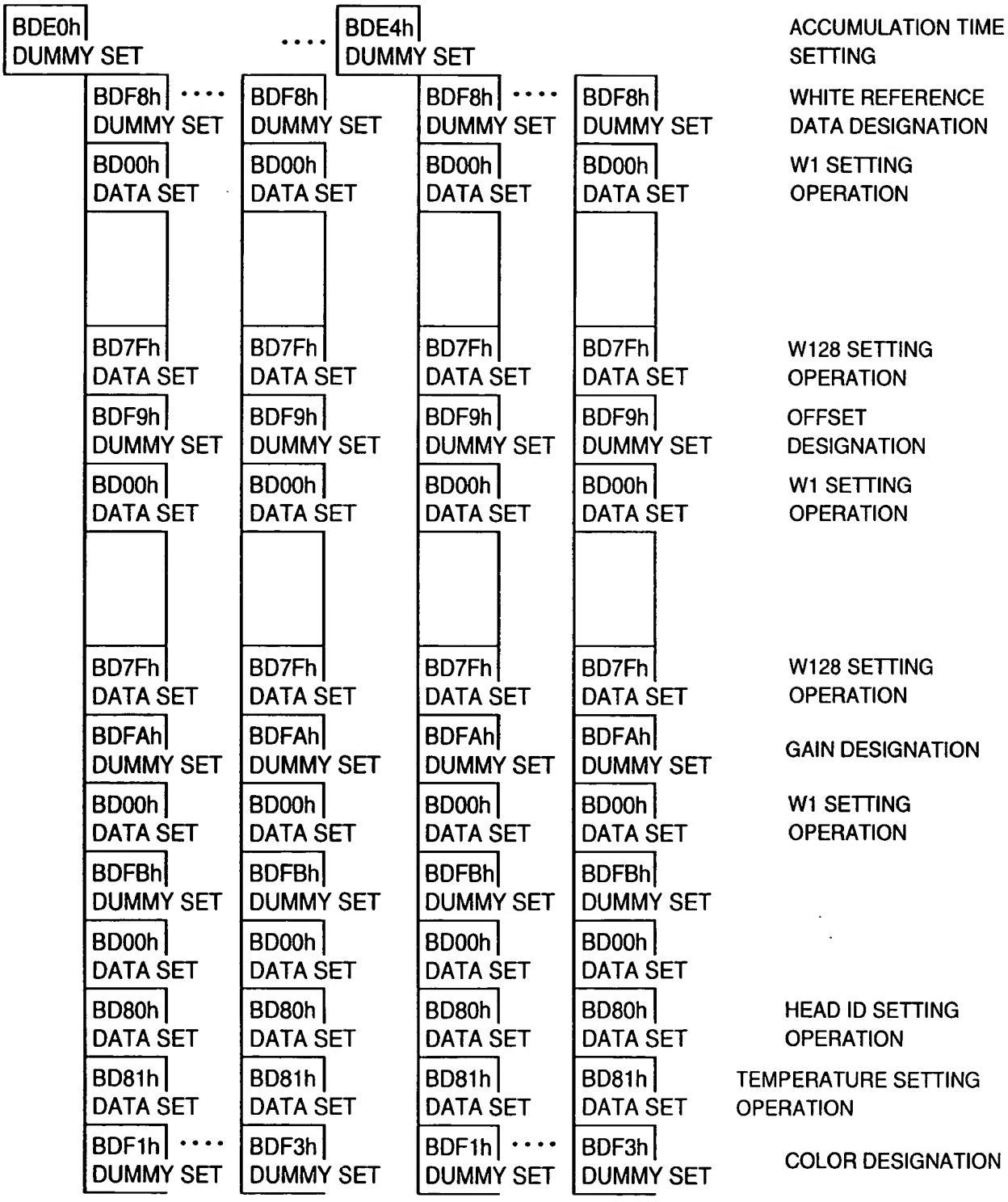
0095426 - 4200 00

FIG. 24



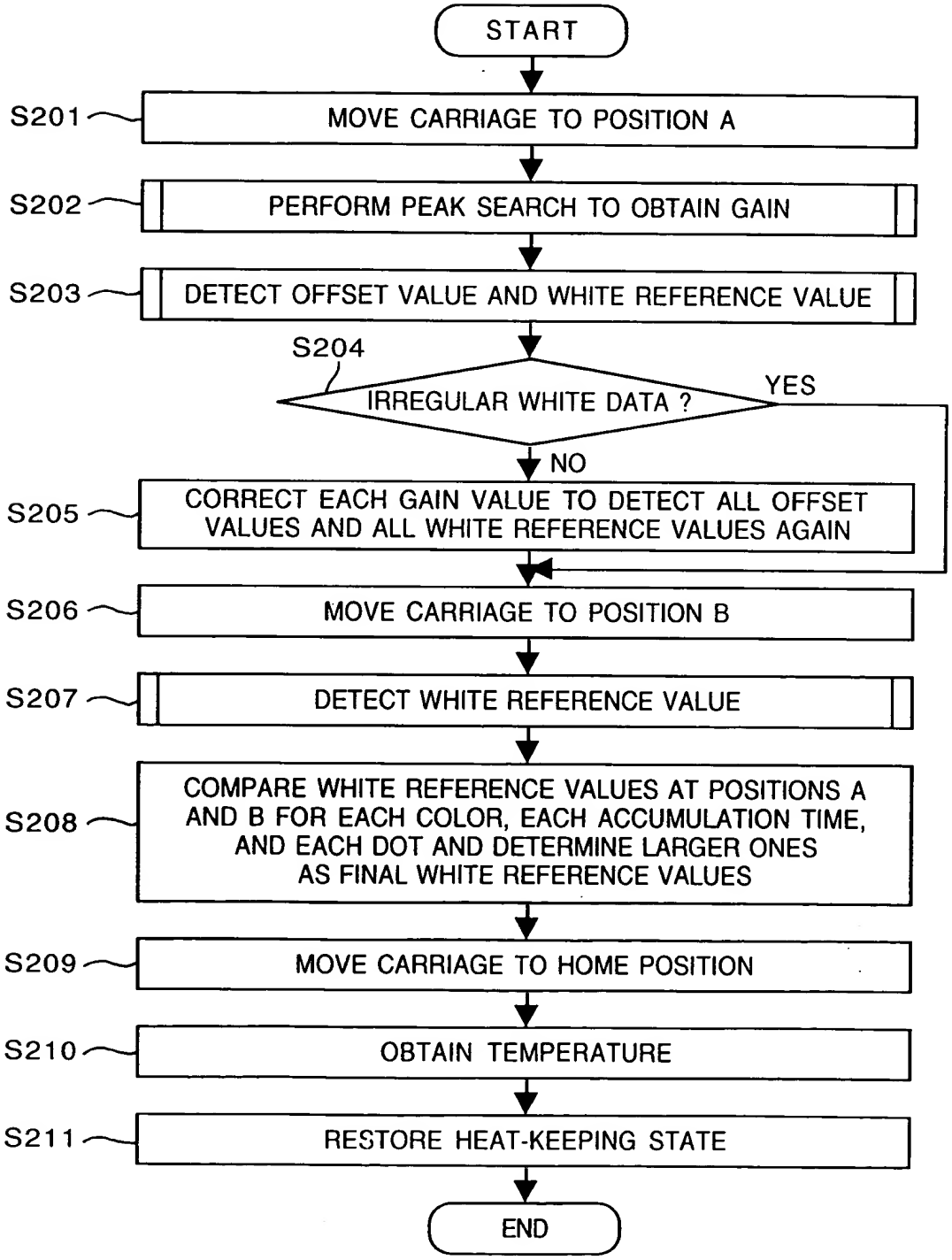
0054826-1120200

FIG. 25



0055805-052000

FIG. 26



EP0956975A2 1999-11-17

FIG. 27

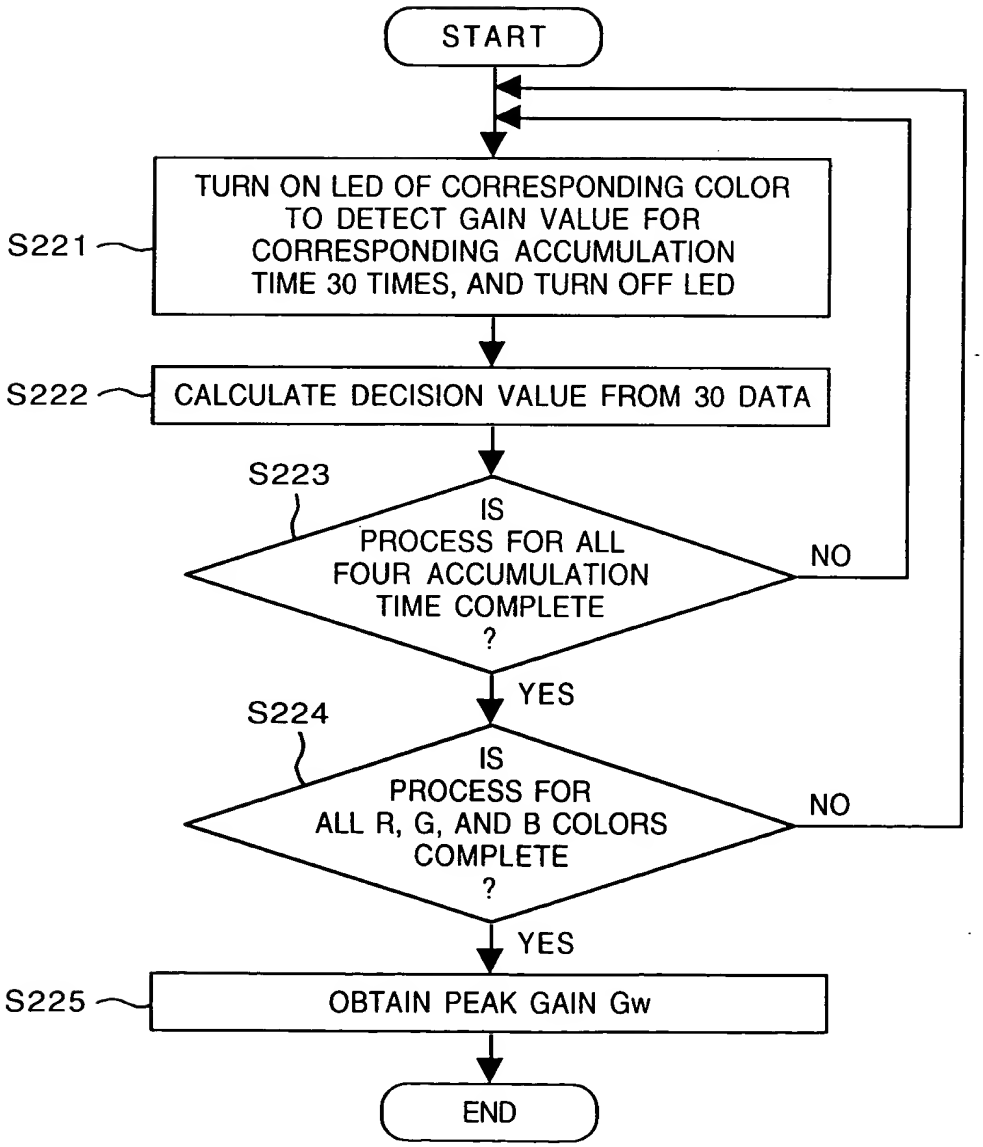
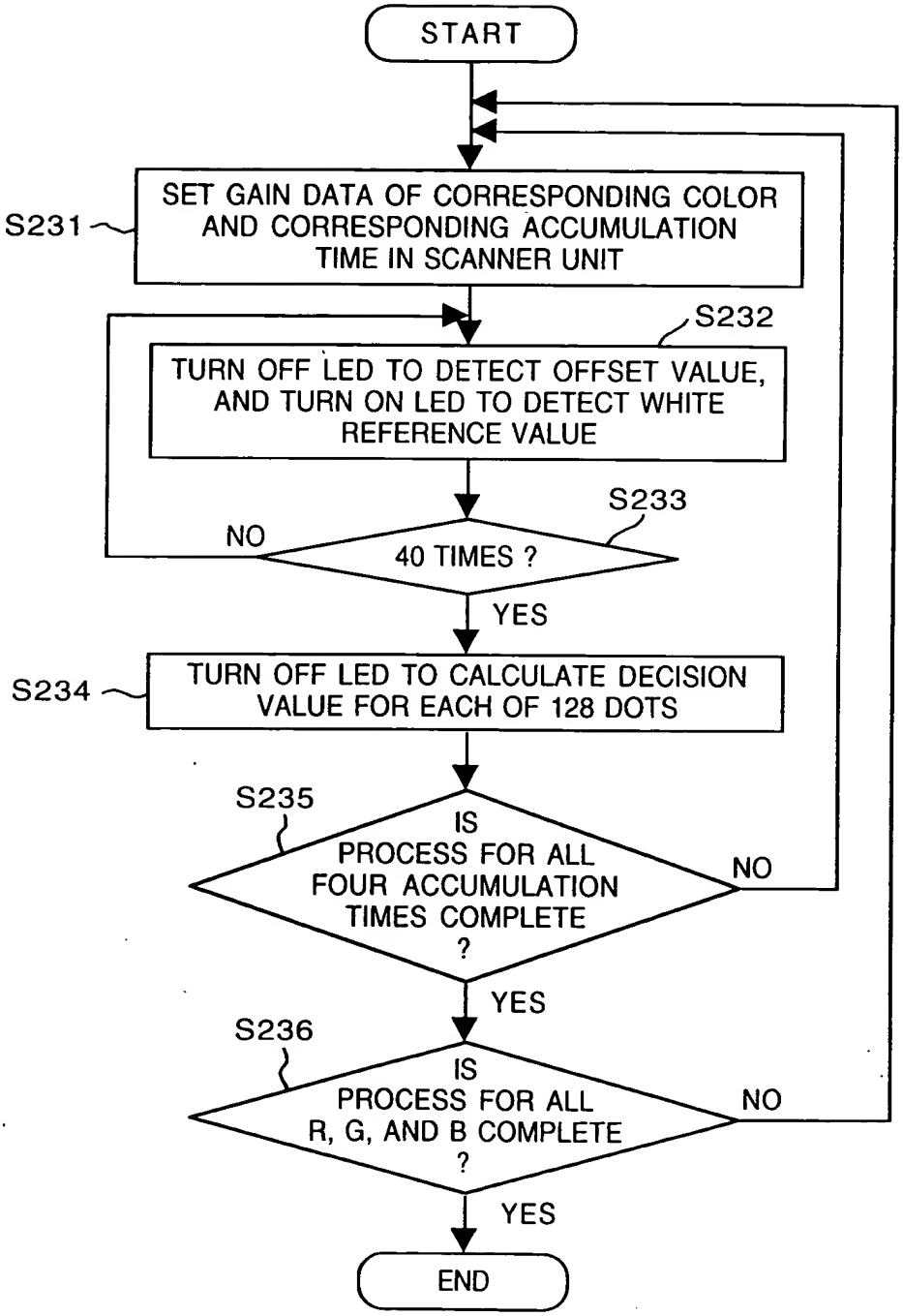

START
TURN ON LED OF CORRESPONDING COLOR TO DETECT GAIN VALUE FOR CORRESPONDING ACCUMULATION TIME 30 TIMES, AND TURN OFF LED
S221
CALCULATE DECISION VALUE FROM 30 DATA
S222
S223
IS PROCESS FOR ALL FOUR ACCUMULATION TIME COMPLETE ?
NO
YES
S224
IS PROCESS FOR ALL R, G, AND B COLORS COMPLETE ?
NO
YES
OBTAIN PEAK GAIN Gw
S225
END

FIG. 28



09/518826 - 120900

FIG. 29

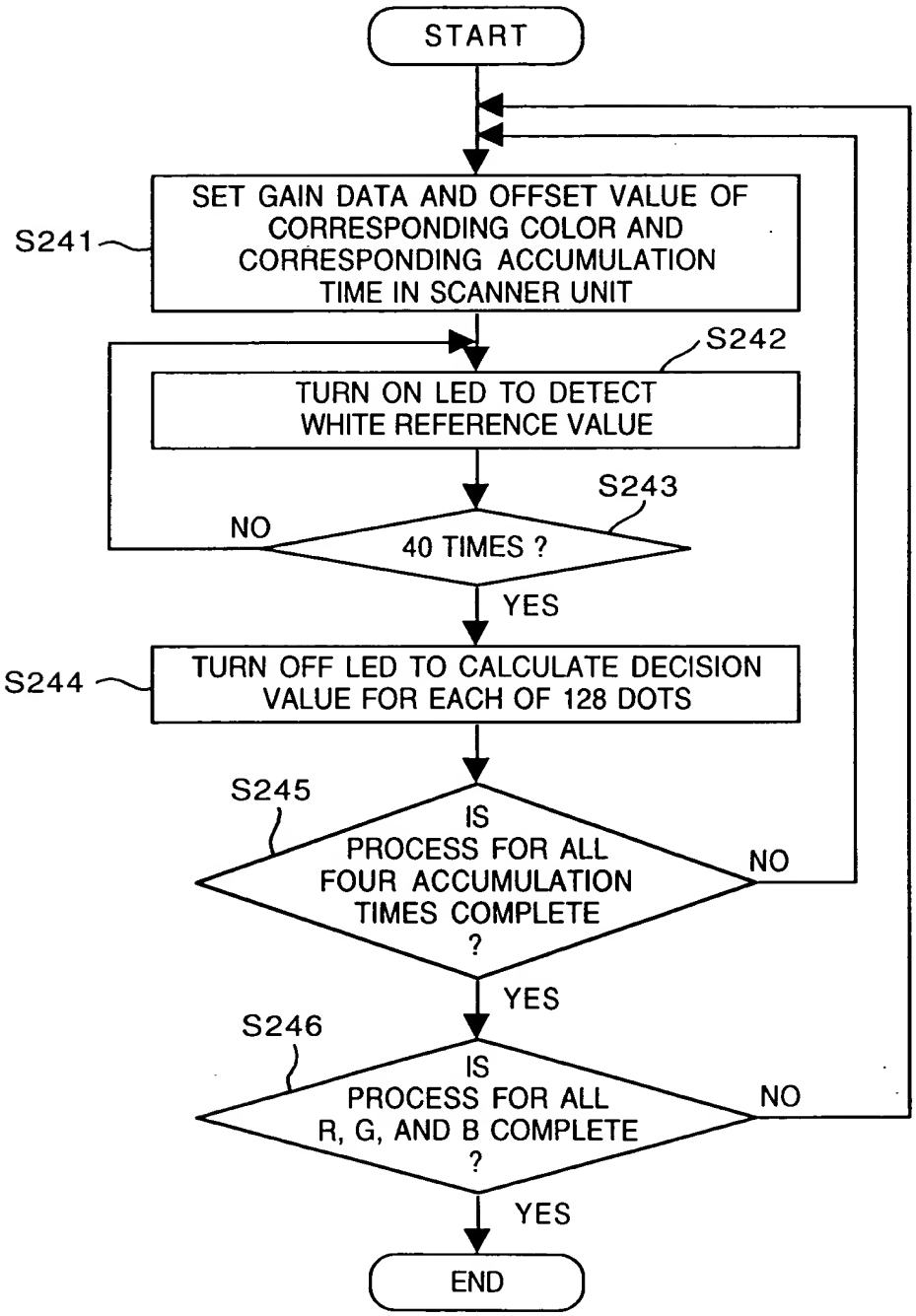
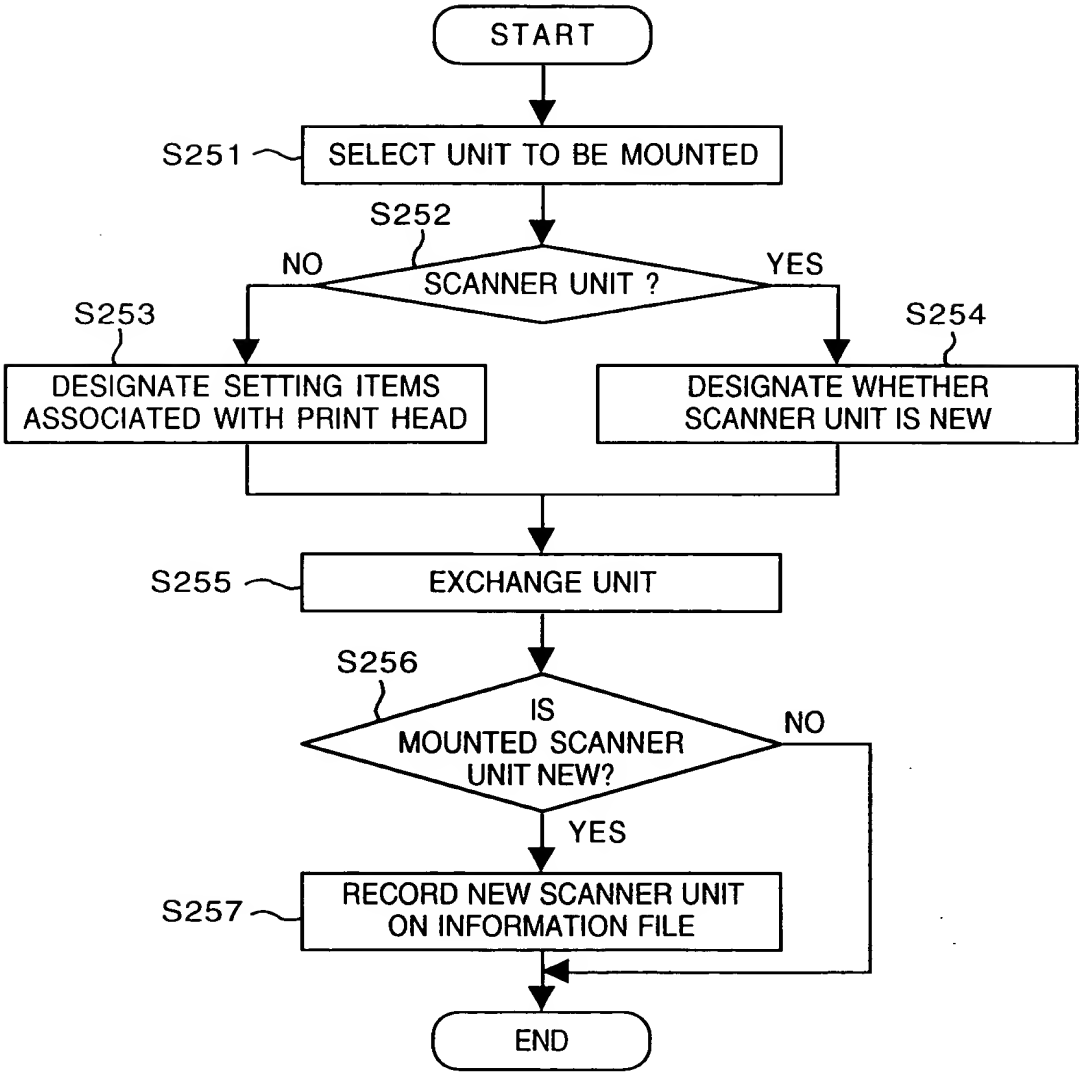
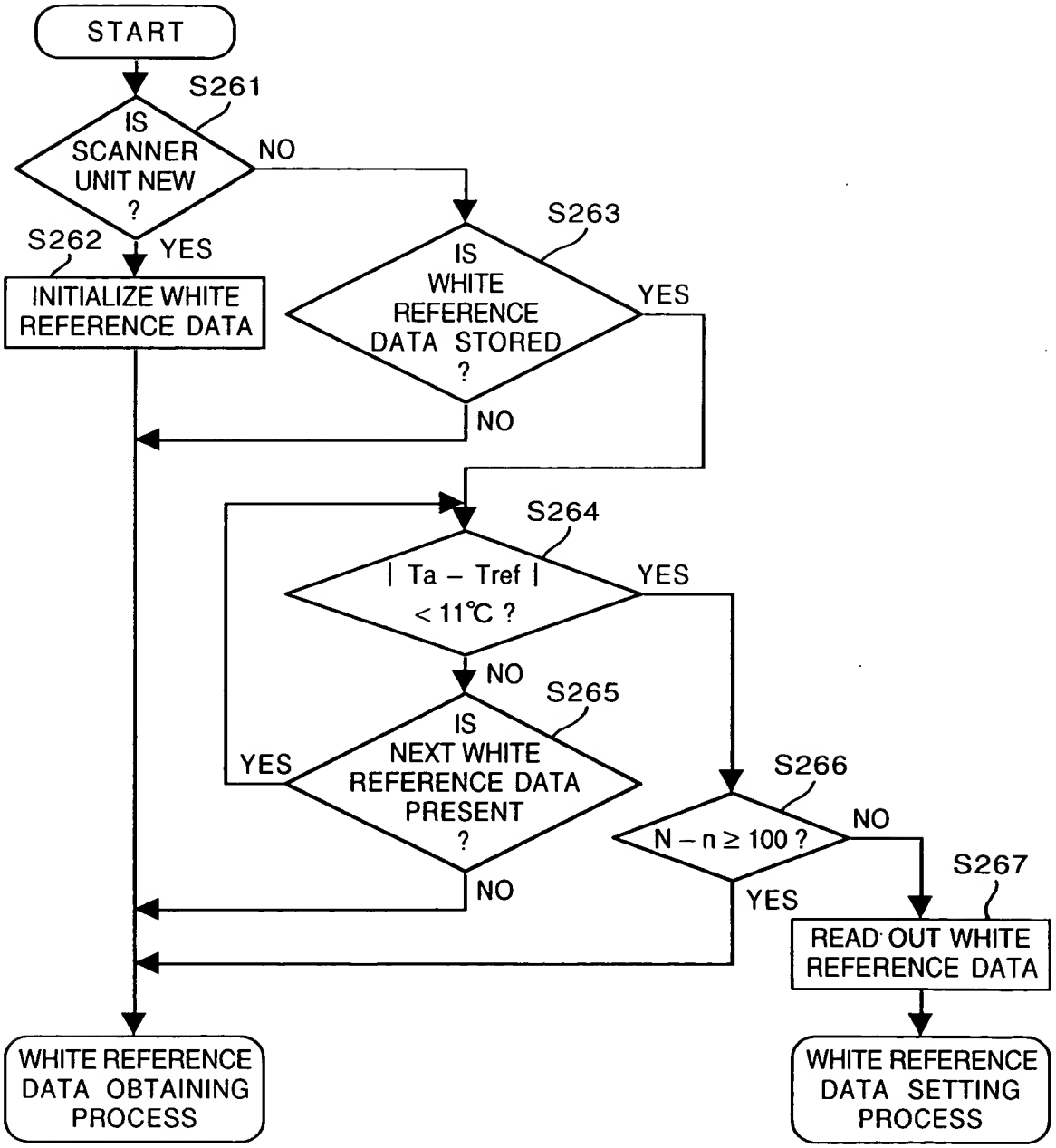

START
SET GAIN DATA AND OFFSET VALUE OF CORRESPONDING COLOR AND CORRESPONDING ACCUMULATION TIME IN SCANNER UNIT
S241
S242
TURN ON LED TO DETECT WHITE REFERENCE VALUE
S243
NO
40 TIMES ?
YES
TURN OFF LED TO CALCULATE DECISION VALUE FOR EACH OF 128 DOTS
S244
S245
IS PROCESS FOR ALL FOUR ACCUMULATION TIMES COMPLETE ?
NO
YES
S246
IS PROCESS FOR ALL R, G, AND B COMPLETE ?
NO
YES
END

FIG. 30



09/25/2006, EAST Version: 2.1.0.9

F I G. 31



09/548826 - 122000

FIG. 32

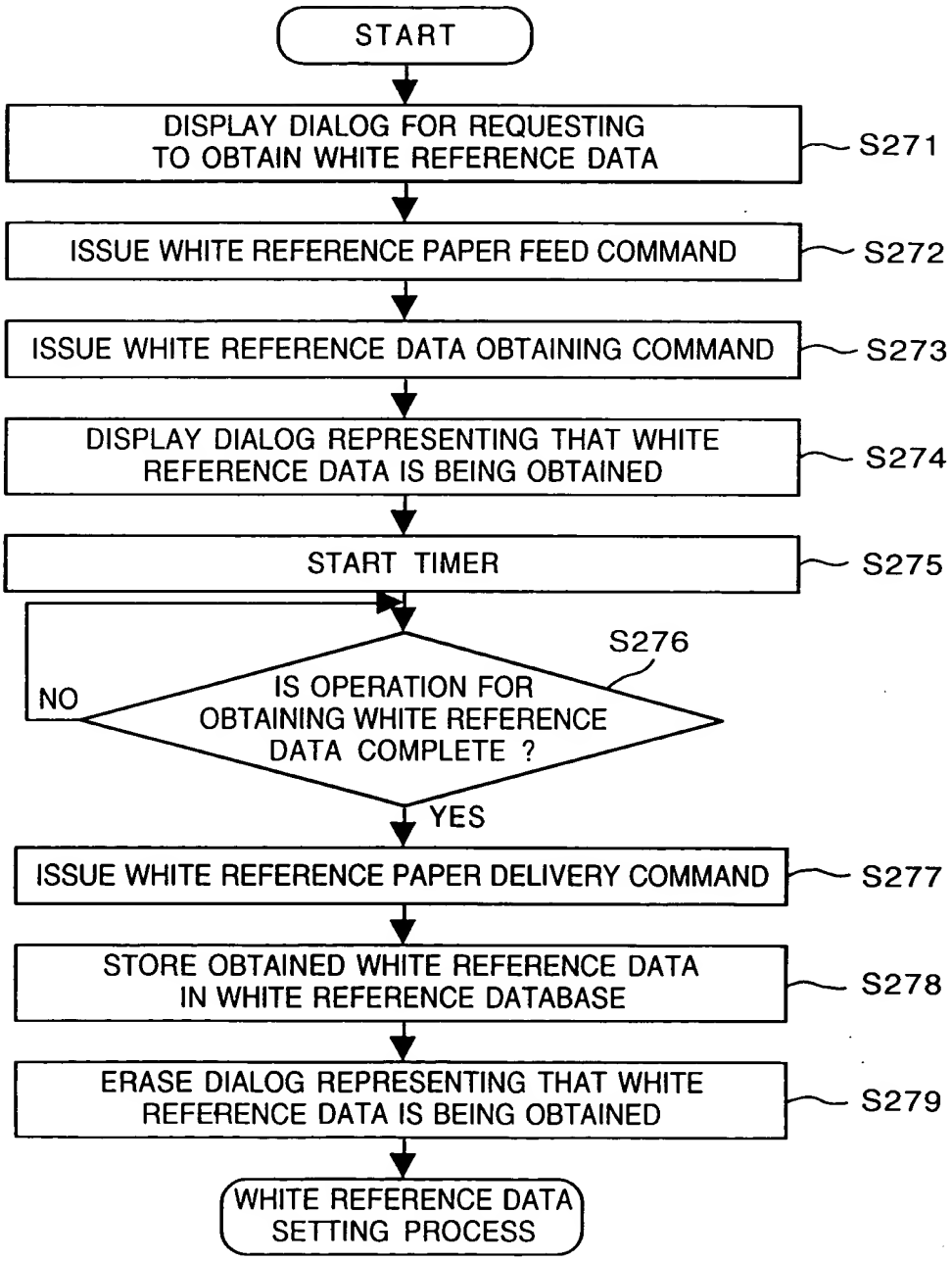
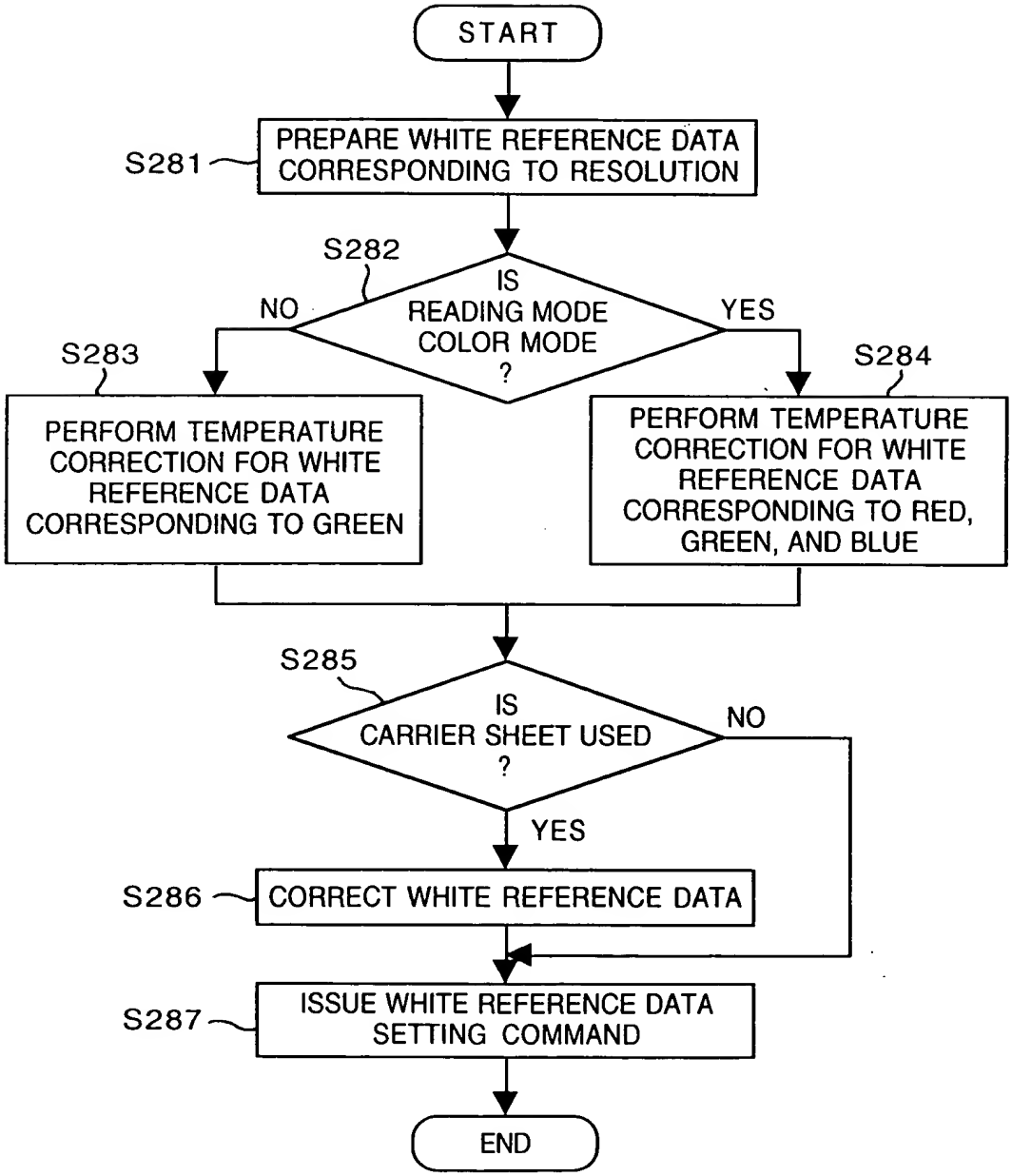

START
DISPLAY DIALOG FOR REQUESTING TO OBTAIN WHITE REFERENCE DATA
S271
ISSUE WHITE REFERENCE PAPER FEED COMMAND
S272
ISSUE WHITE REFERENCE DATA OBTAINING COMMAND
S273
DISPLAY DIALOG REPRESENTING THAT WHITE REFERENCE DATA IS BEING OBTAINED
S274
START TIMER
S275
S276
IS OPERATION FOR OBTAINING WHITE REFERENCE DATA COMPLETE ?
NO
YES
ISSUE WHITE REFERENCE PAPER DELIVERY COMMAND
S277
STORE OBTAINED WHITE REFERENCE DATA IN WHITE REFERENCE DATABASE
S278
ERASE DIALOG REPRESENTING THAT WHITE REFERENCE DATA IS BEING OBTAINED
S279
WHITE REFERENCE DATA SETTING PROCESS

FIG. 33


START
S281
PREPARE WHITE REFERENCE DATA CORRESPONDING TO RESOLUTION
S282
IS READING MODE COLOR MODE ?
NO
YES
S283
PERFORM TEMPERATURE CORRECTION FOR WHITE REFERENCE DATA CORRESPONDING TO GREEN
S284
PERFORM TEMPERATURE CORRECTION FOR WHITE REFERENCE DATA CORRESPONDING TO RED, GREEN, AND BLUE
S285
IS CARRIER SHEET USED ?
NO
YES
S286
CORRECT WHITE REFERENCE DATA
S287
ISSUE WHITE REFERENCE DATA SETTING COMMAND
END